



Huawei Quick Reference Guide to Energy Solutions and Products



Foreword

This is a quick reference guide to Huawei ICT solutions for the oil and gas industry, the solutions are classified as efficient collaboration, reliable broadband network and operational security. Each solution can be applied in one or more scenarios: oilfield exploration, pipeline transportation, refining, and oil and gas enterprise group operation solutions.

Huawei ICT solutions for the oil and gas industry

Solution		Scenario	Oilfield Exploration	Pipeline Transportation	Refining	Enterprise Group Operation
Efficient Collaboration	Digital Oil and Gas Production Solution		√			
	Digital Pipeline Solution			√		
	Cloud Data Center Solution					√
	Container Data Center Solution		√		√	√
	Office Collaboration Solution		√	√	√	√
	Customer Service Hotline Solution					√
	High-definition Videoconferencing Solution		√	√	√	√
	Desktop Cloud Solution					√
	Cloud-based Application Solution					√
Reliable Broadband Network	Network Communications Solution for Oil and Gas Pipelines			√		
	Network Communications Solution for Oilfields		√			
	Submarine Cable Solution for Offshore Oilfields		√			
	Network Communications Solution for Gas Stations					√
	Private Wireless Network CDMA Solution		√	√		
	Private Wireless Network LTE Solution		√	√		
	WAN Interconnection Solution		√	√	√	√
	Comprehensive Campus Network Solution		√	√	√	√
Operational Security	Security Surveillance Solution		√	√	√	√
	Enterprise Group Network Security Solution		√	√	√	√
	Campus Network Security Solution		√	√	√	√
	Cloud Computing Data Center Security Solution					√
	Data Center Disaster Recovery and Backup Solution					√

The solutions may be updated for new version. For the most up-to-date information and the complete product portfolio, refer to the Huawei website at [Http://www.huawei.com](http://www.huawei.com).

For More Information

Huawei has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Huawei Website.

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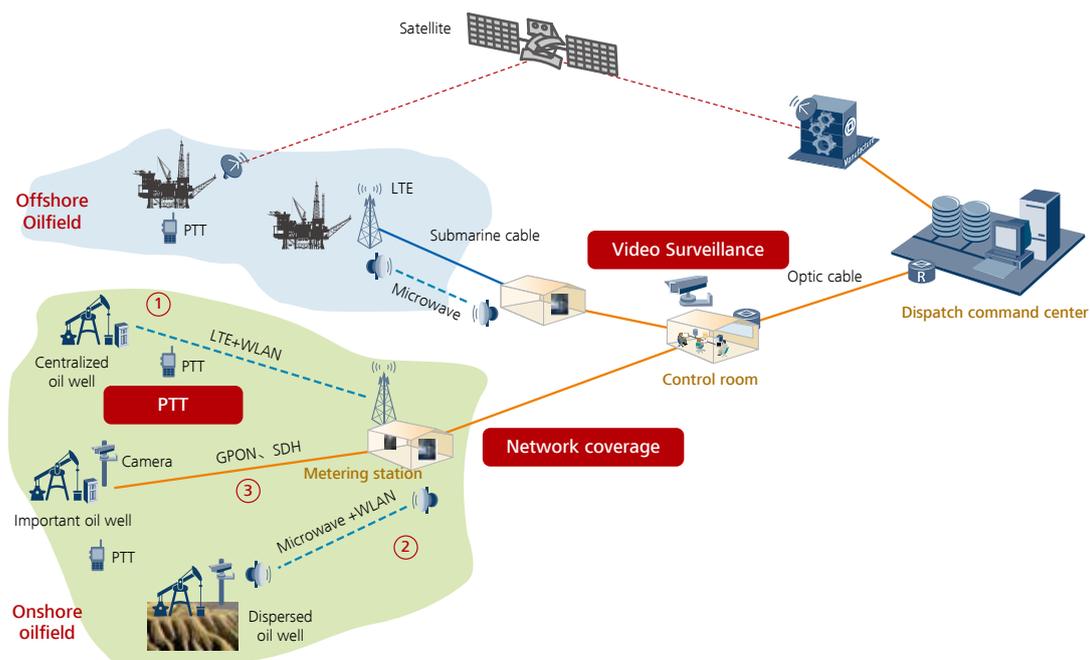
1 Huawei Oil and Gas Digital Production Solution



Oil and gas fields generally extend across large areas and challenging terrain, it is often impossible to collect data in real time by manual data recording. As a result, improving production and management efficiency is difficult. Additionally, traditional manual maintenance methods are challenged by the difficulties of dealing with flammable, explosive, and poisonous substances, as well as the risks of someone stealing or damaging company assets. Maintaining and protecting these assets imposes a heavy workload, reduces efficiency, and requires constant readiness to respond to emergencies.

Based on the information requirements for oil and gas development, Huawei offers an oil and gas digital production solution that provides seamless support from network, communication, and security technologies. The solution can include a variety of network capabilities, trunking communication systems, and video surveillance systems to suit different production environments. Followed figure shows an oil and gas digital production solution network.

1.1 Network Diagram



1.2 Oil and Gas Production Basic Network Solution

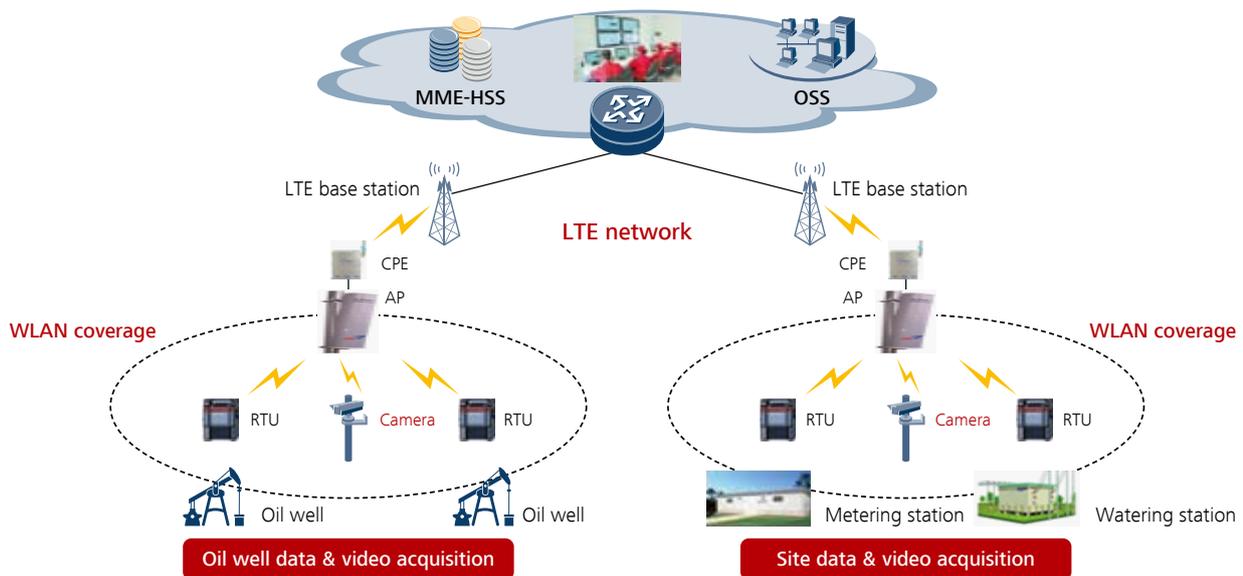
Automation is proving increasingly useful for oil and gas development, so basic networks have to carry ever greater numbers of communication services. Production services such as supervisory control and data acquisition (SCADA) and schedule services demand real-time capability and high reliability. On the other hand, services such as production management, video surveillance, and network access tend to involve high volumes of "bursty" traffic. Supporting all types of traffic requires versatile networking solutions.

1.2.1 LTE+WLAN Network Solution

LTE+WLAN networks can be easily and cost-effectively deployed where a great number of oil and gas wells are distributed. LTE base stations upload data over microwave equipment or optical fibers.

Production data and video surveillance data can be uploaded from any fixed or mobile terminal in the area covered by the LTE network. This data is transmitted to dedicated enterprise networks for oil and gas fields using customer premise equipment (CPE). Sites that cannot be covered by LTE networks can use WLAN networks to form a LTE+WLAN wireless heterogeneous network. In the control centers for oil and gas fields, WLAN equipment can connect to CPE to give network access for multiple users. Oil and gas well sites access LTE networks through access points (APs) in bridge mode.

Network Diagram



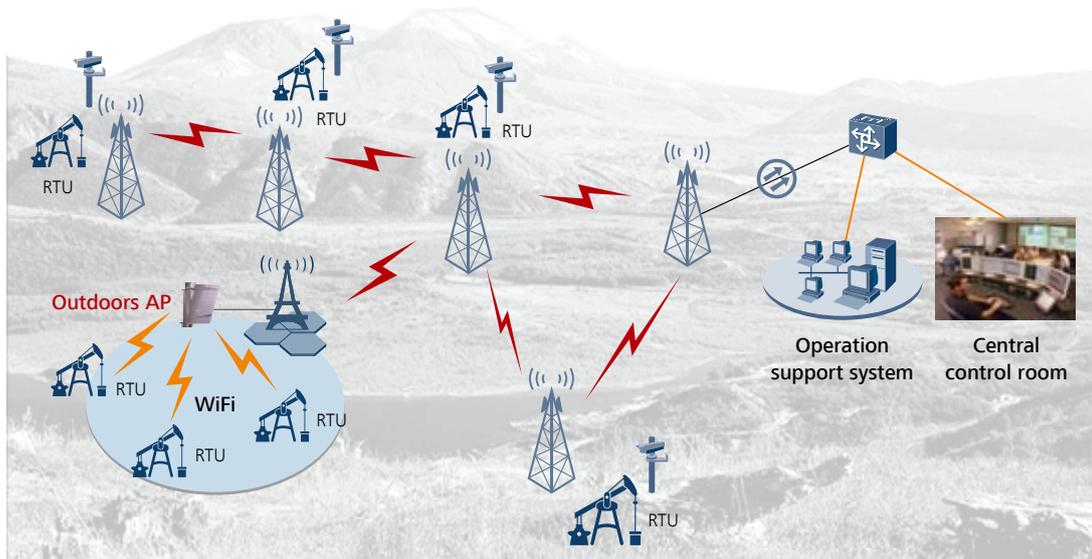
Highlights

- The ratio of uplink bandwidth to downlink bandwidth can be set to suit video surveillance or broadband service requirements.
- CPE is protected to IP66 and suitable for harsh environments.
- Voice, data, and video services can be carried on the same network.
- WLANs can be built flexibly to provide coverage for areas not covered by LTE networks.

1.2.2 Oil and Gas P2P/PMP Network Solution

WLAN networks can be cost-effectively deployed in remote oil and gas fields that have a small number of oil and gas wells, allowing data to be transmitted in point-to-point (P2P) or point-to-multipoint connections. Laying out optical cables or building large numbers of wireless base stations for a few remote oil and gas wells increases OPEX. For a more cost-effective approach, Huawei offers a wireless transmission and coverage solution with microwave equipment or wireless bridge and WLANs. Microwave equipment or wireless bridge work with WLANs to realize an optimal combination. WLANs deployed in small operating areas implement signal coverage, while microwave equipment or wireless bridge transmit data between base stations and wells, including connections for wells that are far way from each other.

Network Diagram



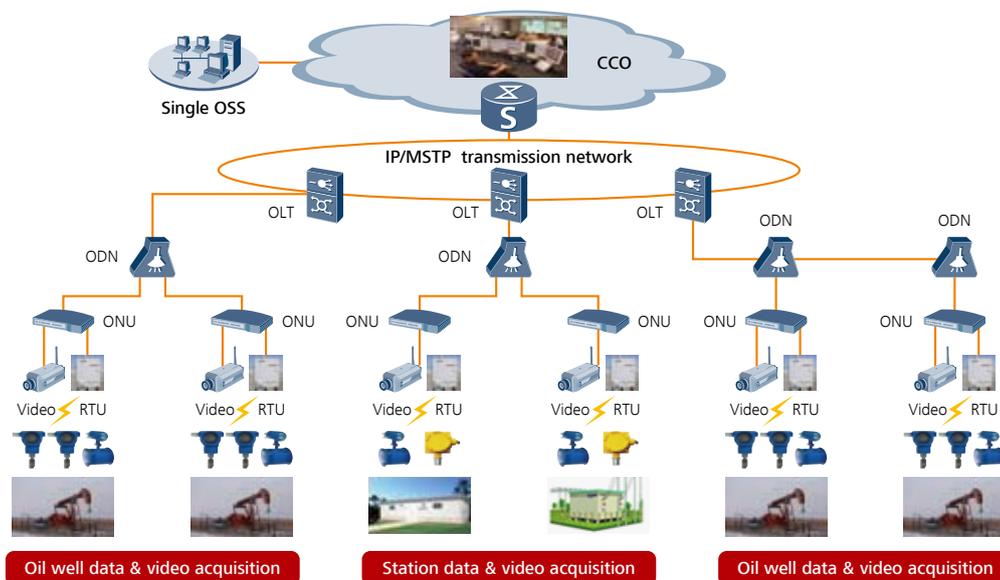
Highlights

- Microwave links provide extremely high bandwidth and can be flexibly deployed.
- Microwave equipment uses air interfaces that support autonegotiation modulation technologies to transmit data reliably under any weather conditions.
- Device-level and network-level protection ensure carrier-class reliability.
- WLANs can be set up flexibly.

1.2.3 Oil and Gas xPON Network Solution

For new oil and gas fields that cover especially large areas, optical fibers can be laid out along with power cables to locations near oil and gas wells to implement wired service transmission and access.

Network Diagram



Highlights

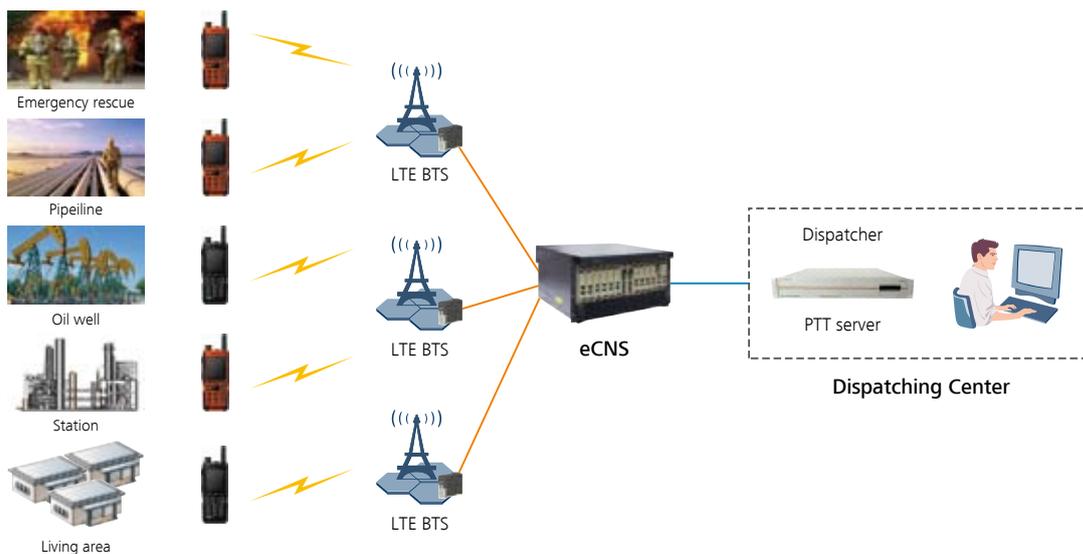
- ONUs are plug-and-play devices and can be configured automatically.
- Services such as IP voice, video surveillance, and high-speed network access are supported.
- Optical power is split in passive mode to save energy.
- Services can be deployed rapidly, and equipment can be maintained conveniently.
- The equipment is protected to IP66 and suitable for a variety of weather conditions.

1.3 Multimedia Digital Trunking Communication Solution

A traditional trunking communication system implements unified scheduling by using intercom and multiparty services. Huawei's trunking communication system supports voice services as well as data and video services. This combination enables users to share site images and technical documentation for preventive maintenance and troubleshooting. Huawei's trunking communication system improves troubleshooting efficiency because experts can more easily obtain detailed site information.

The multimedia digital trunking communication solution applies to activities that benefit from unified scheduling, such as preventive maintenance, troubleshooting, and emergency rescue.

Network Diagram



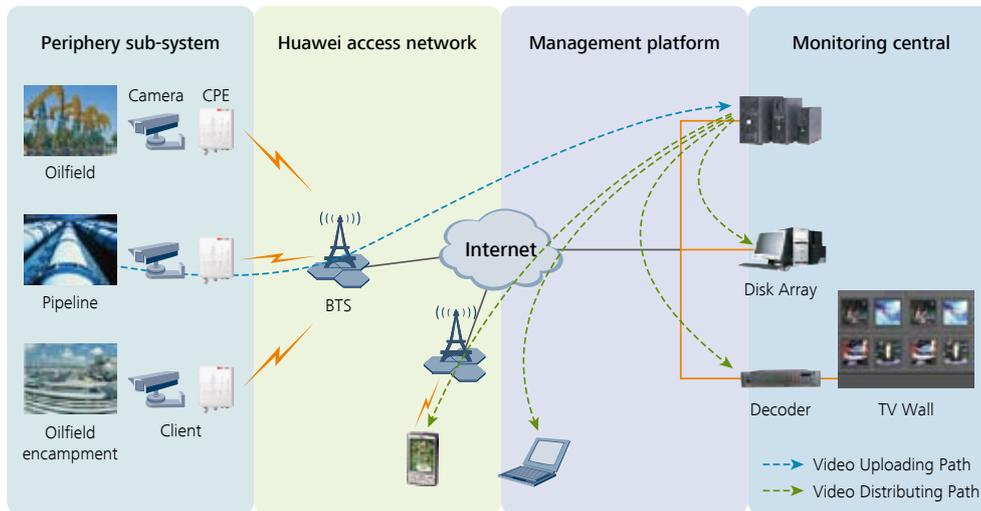
Highlights

- The trunking mode enables multiple parties to talk with each other, facilitating unified scheduling in emergencies.
- Data, photos, and videos can be shared to show site conditions in real time.
- An emergency command vehicle can allow site personnel to communicate with the oil and gas field headquarters using multimedia information to support rapid decision-making.
- End-to-end (E2E) encryption is supported, ensuring information security.

1.4 Digital Production Video Surveillance Solution

With oil and gas wells typically scattered in remote areas with challenging terrain, it is difficult to ensure production security and coordinate personnel by relying only on manual methods. A reliable surveillance system can help. A digital production video surveillance solution uses network cameras deployed in oil and gas fields, along pipes, at crossings, and at plants. These cameras monitor site conditions in real time, analyze the site information intelligently, and generates alarms in emergencies.

Network Diagram



Highlights

- The video surveillance system monitors the production site, intelligently analyzes images, generates alarms for intrusion and thefts, and takes protective measures.
- The control center communicates with production sites to handle alarms and coordinate production remotely.
- The oil and gas field headquarters personnel can keep track of production conditions, analyze data, and make decisions by using the video surveillance system.
- The video surveillance system is compatible with the systems on the live network, maximizing return on investment (ROI).
- An advanced image-compression algorithm minimizes the required transmission bandwidth.

1.5 Products

Product Type	Model	Key Features
Enterprise Networking		
WLAN	AC6605	Max 512 APs management capacity 2*10GE optical interface; 20* GE electrical interface, 4* GE combo interface Power consumption <85W Support white and black user list management, L2/L3 Support standard MIB
	AP6610DN	Outdoor AP 802.11 a/b/g/n 2x2 MIMO 300 Mbps x 2 SFP AC Power Supply
Access(xPON)	MA5683T	The global first all-in-one access platform which can support copper and optical integrated access. It can provide high density POTS, ISDN, G.SHDSL, ADSL2+/ VDSL2, GPON and Ethernet fiber P2P access, triple-play service, TDM/ATM/ Ethernet leased line services for business customers and mobile base access
	MA5680T	
	MA5621	the first multidwelling Appearance unit (MDU) specifically designed for smart grid telecommunication in the industry, which supports natural heat dissipation and provides 2*GE/2*GPON uplink ports and 4*GE/FE+4* RS232/RS485 user ports
	MA5621A	The passive cooling multi-dwelling unit (MDU) developed by Huawei for smart grid reconstruction, which can be used for intelligent electricity consumption information collection and transmission in an electricity system, and can also be used for video monitoring

Product Type	Model	Key Features
Microwave	Optix RTN 980	<p>The RTN 980 is an unified microwave platform providing TDM/Packet/Hybrid services for customer. It supports a maximum of 14 RF directions and provides several types of service interfaces.</p> <ul style="list-style-type: none"> • Frequency: 6/7/8/10/10.5/11/13/15/18/23/26/28/32/38/42GHz • Channel Spacing (MHz): 3.5MHz, 7 MHz, 14MHz, 28MHz, 40MHz, 56MHz • Modulation: QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM*, 1024QAM* • Packet switching capacity: 22Gbps • TDM cross connection capacity: 128×128 VC-4, 2016×2016 Vc12 • RF Direction: maximum of 14 RF directions • Interface: STM-1/4, E1, FE, GE E-Line, E-LAN, QinQ, PWE3 • Support IEEE 1588V2 clock synchronization
	Optix RTN 950	<p>The RTN 950 is an unified microwave platform providing TDM/Packet/Hybrid services for customer. It supports a maximum of 6 RF directions and provides several types of service interfaces.</p> <ul style="list-style-type: none"> • Frequency: 6/7/8/10/10.5/11/13/15/18/23/26/28/32/38/42GHz • Channel Spacing (MHz): 3.5MHz, 7 MHz, 14MHz, 28MHz, 40MHz, 56MHz • Modulation: QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM*, 1024QAM* • Packet switching capacity: 10Gbps • TDM cross connection capacity: 32×32VC-4, full timeslot crossconnections at the VC-12/VC-3/VC-4 level • RF Direction: maximum of 6 RF directions • Interface: STM-1/4, E1, FE, GE E-Line, E-LAN, QinQ, PWE3 • Support IEEE 1588V2 clock synchronization
	Optix RTN 910	<p>The RTN 910 is an unified microwave platform providing TDM/Packet/Hybrid services for customer with several types of service interfaces supported.</p> <ul style="list-style-type: none"> • Frequency: 6/7/8/10/10.5/11/13/15/18/23/26/28/32/38/42GHz • Channel Spacing (MHz): 3.5MHz, 7 MHz, 14MHz, 28MHz, 40MHz, 56MHz • Modulation: QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM*, 1024QAM* • Packet switching capacity: 4.2Gbps • TDM cross connection capacity: 8×8VC-4, full timeslot crossconnections at the VC-12/VC-3/VC-4 level • RF Direction: maximum of 2 RF directions • Interface: STM-1/4, E1, FE, GE E-Line, E-LAN, QinQ, PWE3 • Support IEEE 1588V2 clock synchronization
Network Management System	eSight	The eSight is a next-generation enterprise network management system based on advanced Web 2.0 architecture and uses the browser/server model.
eWBB	DBS3900 LTE	The DBS3900 LTE features a distributed architecture and consists of two basic function modules: eBBU and eRRU. These basic modules can be flexibly configured to meet requirements for different capacities and in different application scenarios for LTE network.
Network Management System	M2000	The next-generation enterprise network management system based on advanced Web 2.0 architecture and uses the browser/server model
Terminal	CPE(TAU600)	customer premises equipment
Core Network	eCNS600	<p>The eCNS600 is a slim core network integrating the function of MME, S-GW/P-GW and HSS with one subrack to save CAPEX.</p> <p>Subscribers: 20K Subscribers Throughput: 4Gbps/Board Weight: <50kg Power consumption: <1300W Less footprint: 622x442x400(mm) Support roaming, handoff, user information management, authentication and encryption</p>
Enterprise UC&C		
HD cameras	eSpace IPC2601-P/5601-P	Box network camera
	VS-IPCD143C-P/13C-P	HD box network camera
	VS-IPCH13BM-P	Wide dynamic HD box network camera
	eSpace IPC2701-P/5701-P	Semi-dome indoor network camera
	VS-IPCH23C-PoE	Waterproof violation-proof HD semi-dome network camera
	VS-IPCD33C3 VS-IPCH33C3	Outdoor HD intelligent dome network camera

Product Type	Model	Key Features
SD Cameras	VS-IPC-D11P-P VS-IPC-D12P-P	Box network camera
	VS-IPC-D11P-IR1 VS-IPC-D12P-IR1	Infrared waterproof box network camera
	VS-IPC-H12B-PoE	Wide dynamic box network camera
	VS-IPC-D22P-IR1	Indoor infrared semi-dome network camera
	VS-IPC-D22P	Indoor violation-proof semi-dome network camera
	VS-IPC-H22BP	Indoor wide dynamic violation-proof semi-dome network camera
	VS-IPC-D323/329/325/328	6-inch high-speed intelligent dome network camera
	VS-IPC-H32BP9 VS-IPC-H315-IR8	Outdoor high-speed intelligent dome network camera
Analog Cameras	VS-CA-D12P VS-CA-H12P	Box analog camera
	VS-CA-D12P-IR1	Infrared box analog camera
	VS-CA-D12BP VS-CA-H12BP	Wide dynamic box analog camera
	VS-CA-D22P/D21P	Indoor semi-dome analog camera
	VS-CA-H22P-IR3	Indoor infrared waterproof semi-dome analog camera
	VS-CA-H22P	Indoor violation-proof semi-dome analog camera
	VS-CA-D323/329/325/314	Outdoor intelligent dome analog camera
	VS-CA-H315-IR8	Outdoor infrared high-speed intelligent dome analog camera
DVS&DVR	VS-EC-D24R/D28R/D29R	Video recorder
	VS-EC-D19R	Video recorder
	VS-EC-D24M	Vehicle-mounted video recorder
	VS-EC-D21S/D14S	Video server
	VS-EC-H24R/H28R/H29R	Video recorder
	VS-EC-H21S	Video server
Decoder and Decoding Card	VS-DC-D38F	Soft-decoding server
	VS-DC-D24	Decoder
	VS-DC-D24F/D21H	HD decoder
	VS-DC-H21F	HD decoder
	VS-DC-H24H/H28H	Decoder
	eSpace DEC6001	Decoder
NVR	SmartNVR 100	NVR managing a maximum of 16 cameras
	SmartNVR 3000	NVR managing a maximum of 128 cameras
Enterprise IT		
Server	RH2285	Large-capacity storage, high-performance server products distributed storage, data mining, electronic photo album, video and storage business, and enterprise infrastructure applications
	E6000	A new generation of carrier-class blade server platform, integrated computing, switching, storage, IO and management functions
Unified Threat Management	Eudemon200E Series	Security business needs for small and medium enterprises, the introduction of a new generation of unified security gateway, a firewall, routing, anti-DDOS, wireless (WiFi/3G), intrusion protection (IPS), anti-spam, anti-virus, URL filtering, Internet management VPN features in one
	Eudemon1000E Series	For the large institutions, parks and launch of data center unified security gateway
Data Center Firewall	Eudemon8000E Series	10 Gigabit IPS security gateway, its flexible I / O interface configuration, as well as extensive security operations to protect, to fully meet the user of the data center, ISP and other highly integrated network security, fast response, high-speed processing and long-term security needs.
SSL VPN	SVN300/2230/5530	The secure access gateway for remote access of corporate, government, carriers, mobile office, third-party access, multimedia tunnel access and other security access applications provide a safe overall solution

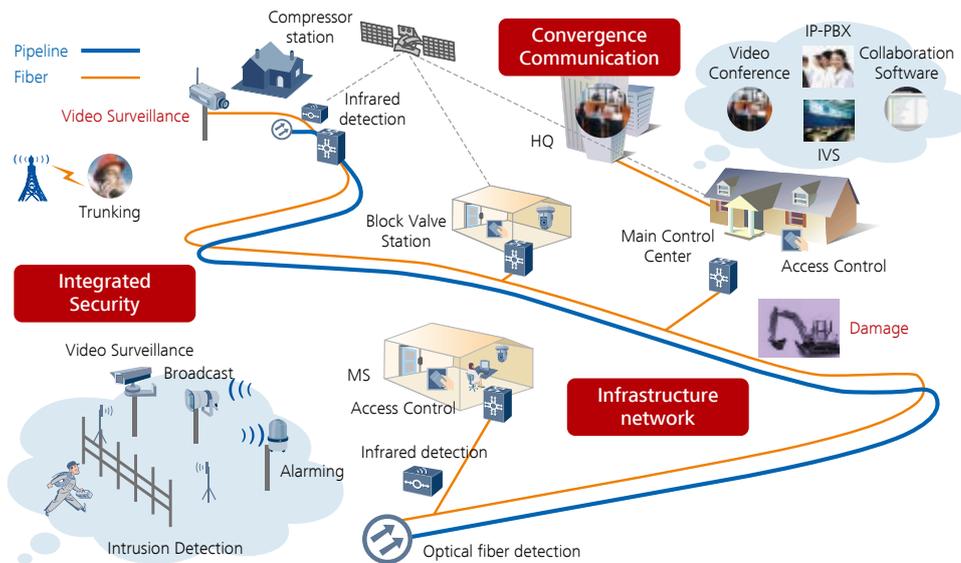
2 Huawei Digital Pipeline Solution



Pipeline engineering is complex, and pipelines must cross long stretches of challenging terrain. Manual pipeline management covers only the main sites along pipelines and imposes a heavy workload, low efficiency, and high labor costs. Oil and gas pipelines typically rely on conventional scheduling, conferencing, and telephone systems that are independent of each other. The systems have to be maintained at high cost but have low communication and decision-making efficiency. These issues only add to the traditional challenges of pipeline wear and tear due to corrosion, harsh environments and disasters, as well as theft and vandalism.

By devoting our efforts to analyzing the communication requirements for long-distance pipeline transportation, Huawei has launched the digital pipeline solution. This solution covers a backbone network, convergence communication, and integrated security. The solution applies a variety of communication measures to provide a reliable and unified office communication platform and intelligent security surveillance system for the sites deployed along long-distance oil and gas pipelines. With the ability to meet challenges from harsh environments, the solution helps overcome operating and maintenance (O&M) difficulties. By working with a supervisory control and data acquisition (SCADA) system, the solution helps companies master the pipeline operating status in real time for ease of risk response and improved efficiency.

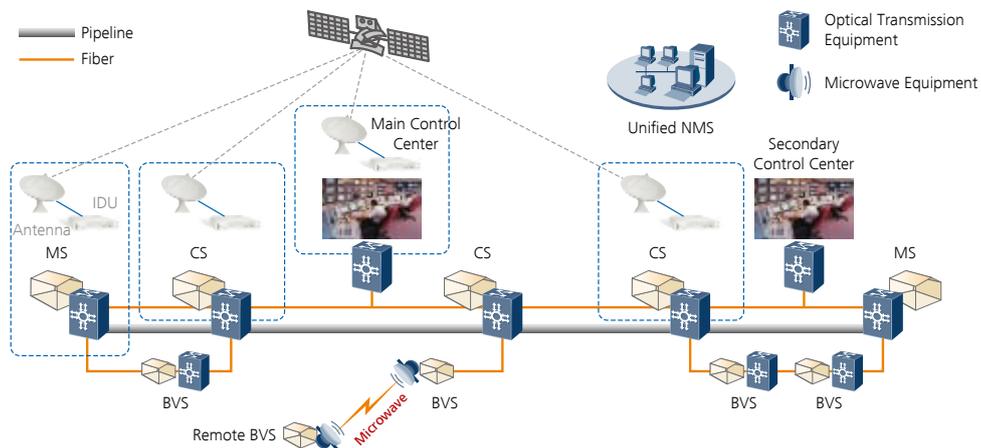
2.1 Network Diagram



2.2 Infrastructure Network Solution

Huawei digital pipeline infrastructure network solution uses optical fibers as the main transmission media. In remote sites and other areas difficult to reach with optical fibers, microwave transmission is used. A very small aperture terminal (VSAT) satellite communications system provides backup links for the main control centers, metering stations, pumping stations, and compressor stations. If fiber transmission is disrupted, the SCADA and hotline services switch to the VSAT system.

Network Diagram



Highlights

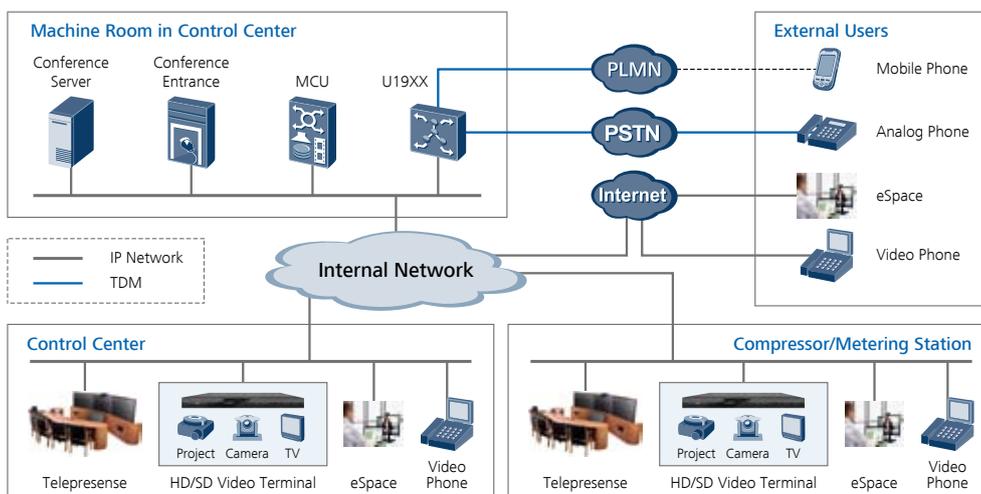
- Services switch to backup links within 50 ms, ensuring service reliability.
- The optical network uses a chain or ring network topology, which helps prevent single-point failures from disabling the entire network.
- Both fiber and microwave transmission are employed for seamless coverage, which maximizes the return on investment (ROI) and simplifies operation and maintenance.
- Pipeline data transmission can seamlessly switch between fiber and satellite communication to ensure 24/7 communication in any weather conditions.

2.3 Convergence Communication Solution

Huawei convergence communication network allows access from a variety of terminals, including analog phones, IP phones, video phones, software clients, PCs, Wireless Fidelity Alliance (WiFi) phones, and trunking phones. An Internet Protocol (IP) network connects most of these devices and enables convenient and efficient conferences. Analog terminals such as analog phones and fax machines access the IP network using analog subscriber boxes or integrated access devices (IADs). Switches enable terminals to communicate with each other over the IP network and interwork with fixed networks or operator networks.

2.3.1 Multipoint convergence conference system

Network Diagram

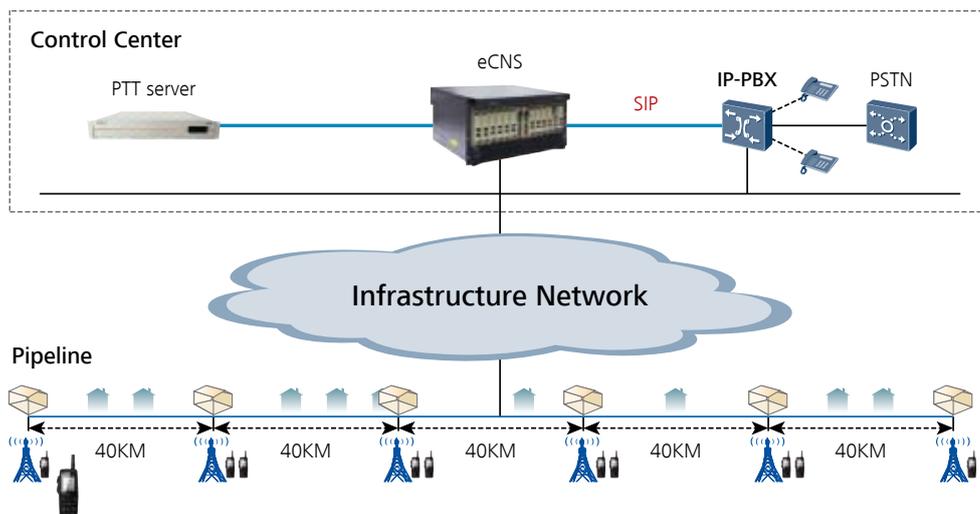


Convergence conference terminals include intelligent systems, high definition (HD) or standard definition (SD) video terminals, video phones, IP phones, analog phones, and mobile phones. The convergence conference system carries voice, video, and data services and offers manageability and security features.

An all-in-one voice service system facilitates the convergence of wireless transmission and wired transmission, as well as convergence of administration and scheduling, and analog and IP phones.

2.3.2 All-in-one voice service system.

Network Diagram



As shown above, the private branch exchange (PBX) interworks with the public switched telephone network (PSTN). The enterprise core network system (eCNS) of the LTE-based enterprise wireless broadband (eWBB) network interworks with the PBX over the Session Initiation Protocol (SIP). Baseband units (BBUs) and remote radio units (RRUs) are deployed along pipelines to achieve overall digital trunking coverage. Waterproof, dustproof, and flameproof terminals are employed to support scheduling and negotiation during preventive maintenance, troubleshooting, and emergencies.

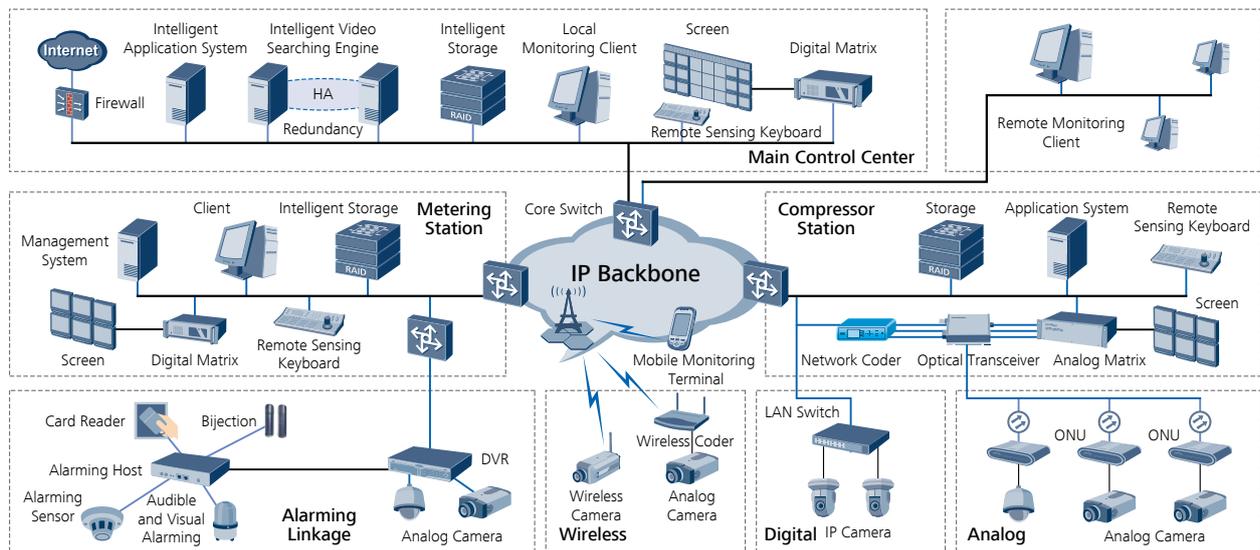
Highlights

- The all-in-one voice service system is fully compatible with existing communication systems, which maximizes ROI.
- Push-to-talk (PTT) phones, analog phones, and IP phones can communicate with each other.
- The digital trunking system covers all pipelines, and all communication links are encrypted in end-to-end (E2E) mode.
- Data and video services are supported, and video can be captured and sent during preventive maintenance.
- Trunking calls can get through quickly to achieve efficient scheduling and cooperation. For example, the start-to-speak (STS) time is 0.7s, and the right-to-speak (RTS) time is 150 ms.

2.4 Integrated Security Solution

Huawei digital pipeline integrated security solution consists of the IVS, SCADA, intrusion detection system (IDS), and access control system (ACS). IP cameras, analog cameras, and wireless cameras capture surveillance images. The devices use IP networks to store the images on local disk arrays in compressor stations or metering stations, or upload the images to main control centers over basic networks. By using the application system and management system, users can invoke, browse, replay, and manage the images, and simulate operations based on videos. The IVS works with the IDS and ACS to generate alarms and take preventive measures. The IVS also works with the geographic information system (GIS) to locate surveillance points and present an overall location view.

Network Diagram



Highlights

- The devices work 24 hours a day, 7 days a week and have low error rates, ensuring high reliability.
- The alarm generation and automatic detection functions provide a high level of security.
- The IP network carries all services and provides a flexible and open architecture.
- Warning and visualized management ensure easy operation.
- Sites are monitored in real time, and risks are responded to rapidly.

2.5 Product Index

Product Type	Model	Key Features
Enterprise Networking		
Transmission	OptiX OSN 8800 Series	Based on its insights into future transport network and service trends, Huawei has announced its OTN bandwidth cloud solution. This solution integrates various types of sophisticated technologies, including 40G/100G, large-capacity OTN optical/electrical cross-connection, photonic integrated device (PID), and ASON technologies. This solution uses a complete set of OTN-based products, namely, OptiX OSN 8800, OptiX OSN 6800, and OptiX OSN 1800. By using these OTN-based products, this solution provides an intelligent and reliable network that features ultra-large capacity, dynamic resource sharing, and quick access.
	OptiX OSN 6800	
	OptiX OSN 1800	
	OptiX OSN 7500/7500 II	Huawei's OptiX OSN intelligent optical transport systems constitute Huawei's end-to-end intelligent optical network solutions that span from the backbone layer to the access layer.
	OptiX OSN 1500	
	OptiX OSN 3500	Huawei Hybrid MSTP solutions use a unified switching architecture and accommodate both traditional MSTP transmission and packet transmission. Additionally, these solutions are compatible with existing MSTP networks and facilitate smooth bearer network evolution, with enhanced performance and at reduced costs.
	OptiX OSN 550	
	Microwave Optix RTN 980/950/910 Series	RTN microwave series products are the only IP microwave transmission systems in the industry to support TDM, Hybrid, and Packet modes simultaneously. These products make up for limitations on optical transmission and efficiently support multiple services through improved microwave transmission performance.
Routers	AR3200/2200/1200/200	The AR3200, AR2200, AR1200, and AR200 integrate the routing, switching, 3G, voice, and security functions. They meet diversified application requirements for service expansion.
Switch	S9300/9700	The S9300 and S9700 are next-generation high-end terabit core routing switches that are designed for multi-service convergence.
	Sx700 Series	Campus network convergence for the enterprise network users, access, IDC access and Gigabit, Fast to the desktop, and a variety of scenarios developed by the cassette switch series

Product Type	Model	Key Features
Network Management System	eSight	The eSight is a next-generation enterprise network management system based on advanced Web 2.0 architecture and uses the browser/server model.
Enterprise Wireless		
eWBB	DBS3900 LTE	The DBS3900 LTE features a distributed architecture and consists of two basic function modules: eBBU and eRRU. These basic modules can be flexibly configured to meet requirements for different capacities and in different application scenarios for LTE network.
Network Management System	M2000	The next-generation enterprise network management system based on advanced Web 2.0 architecture and uses the browser/server model
Terminal	Handheld Terminal T811/T811EX	Explosion proof/anti explosion, IP67 protection, Ex ic IIC T4 verified (Optional), working temperature: -200C ~ 550C
	Outdoor CPE T660/F660	IP67 protection, Ex ic IIC T4 verified (Optional), working temperature: -400C ~ 650C
Core Network	USN9810	A product provides the functionalities of the mobility management entity (MME) and provides integrated user authentication management, which is part of System Architecture Evolution-home subscriber server (SAE-HSS)'s functionalities
	UGW9811	A product combines the functions of a serving gateway (S-GW) and a PDN gateway (P-GW)
BSC(TruStar)	BSC6680	The BSC6680 product of the new generation uses the newest next-generation platform for the base station controller, that is, the platform of advanced radio controller (PARC). The BSC6680 also uses advanced technologies of the industry and future-oriented designs. It provides multiple excellent functions. The BSC6680 has the following features: 1High reliability, Large capacity, 2Abundant interfaces, 3Ultra-high integration and ultra-low power consumption, 4Flexible configuration and convenient
RAC(TruStar)	RAC6690	The RAC6690 product is very similar with BSC6680, but RAC6690 also has Interworking function (IWF)
	RAC6610	1High reliability, Large capacity, 2Abundant interfaces, 3Ultra-high integration and ultra-low power consumption, 4Flexible configuration and convenient maintenance, 5 High-performance IP central switching network, 6Flexible and excellent All-IP networking capability, 7 Interworking function (IWF) *(internal visible)RAC6610 compare with RAC6690, 1.not support DORB (2) not support evolution; (3) only support end of version CBSS6.0
BTS(TruStar)	BTS3900	Base station used in indoor surrounding
	DBS3900	The DBS3900 TruStar features a distributed architecture and consists of two basic function modules: eBBU and eRRU. These basic modules can be flexibly configured to meet requirements for different capacities and in different application scenarios for LTE network.
Trunking Communications	MSE9830	The MSE9830 includes four primary parts: trunking switching center (TSC), GLMS server, iGWB server, and BAM server. The TSC is responsible for the call processing and media forwarding. The GLMS is responsible for the saving of user, group and VPN data and the authentication of users. The iGWB is responsible for keeping the communication of the bill and the charging system. The BAM is responsible for the data configuration and the maintenance.
	UAP3300	The UAP3300 (here, the UAP is short for the Universal Access Platform) is the access device of the multimedia contact center. The UAP3300 provides the functions of the call access, agent, and media resource for the Internet Protocol Call Center (IPCC), supports the interconnection with the Computer & Telephony Integration (CTI) platform, and provides manual services and automatic IVR services.
PTT Terminals	C830e	The C830E supports both the code division multiple access (CDMA) and the evolution-data optimized (EVDO) standards. It provides abundant functions and powerful media processing capabilities, including: Professional PTT function MMS, email, and website browsing Streaming, data modem and GPS MP3/MP4 playing, audio/video recording, and Bluetooth Expandable memory through Micro-SD card 3M AF camera Support IP54 Protection Standard In the CDMA network or the EVDO network, you can use the HUAWEI C830E to make/receive calls, send/receive SMS/MMS, browse the Internet send/receive emails and schedule personal information.
	C830T	C830T is almost the same with C810e, but it works in frequency 800M

Product Type	Model	Key Features
	C830e-ex	The HUAWEI C830e-ex supports both the code division multiple access (CDMA) and the evolution-data optimized (EVDO) standards. It provides abundant functions, including: Intrinsically safe protection Professional PTT function E2E encryption (Optional) DMO (Optional) Support IP54 Protection Standard SMS, MMS Data modem GPS (Optional) MP3/MP4 playing, audio/video recording Expandable memory through Micro-SD card In the CDMA network or the EVDO network, you can use the HUAWEI C830e-ex to make/receive calls, send/receive SMS/MMS. It works in frequency 450M
	C830T-ex	C830T-ex is almost the same with C830e-ex, but it works in frequency 800M
	HC9000e	The HUAWEI HC9000e mobile phone supports both the code division multiple access (CDMA) and the evolution-data optimized (EVDO) standards. The HUAWEI HC9000e provides abundant functions, including: Professional PTT function E2E encryption DMO (Optional) Support IP54 Protection Standard SMS, MMS Data modem GPS (Optional) MP3/MP4 playing, audio/video recording Expandable memory through Micro-SD card In the CDMA network or the EVDO network, you can use the HUAWEI HC9000e to make/receive calls, send/receive SMS/MMS. It works in frequency 450M
	HC9000T	HC9000T is almost the same with HC9000e, but it works in frequency 800M
Data Cards	EC900	450M DORA Datarcard CDMA450MHz A/C band 1x/EV-DO Rel.0/EV-DO Rev.A/SMS Wireless receiving sensitivity: -100 dBm Maximum transmit power: 23 dBm Weight: about 50g Size: 86mm* 46.5mm*10.5mm
	EC9001	450M&2.1G Dual-Mode USB Datarcard Support CDMA2000 1x EV-DO Rev. A / Rev. B Support UMTS 2100MHz frequency band Support SMS and Voice (Optional) services Support receive diversity
Enterprise UC&C		
eSpace	eSpace U2990	With strong networking capabilities, and call admission seats and media resource function for call center
	eSpace U1980	
	eSpace U1910	
	eSpace IAD132E/32T	IP PBX remote access equipment to provide small and medium-capacity VoIP (Voice over IP) / FoIP (Fax over IP) access
	eSpace IAD1224	
IP Phone	eSpace6800	IP telephone terminal
	eSpace7800	
	eSpace8500	
	eSpace AT7600	
Gateway	EGW1500E	Set of access, wireless, security, voice, ICT used in one
UC Server	UC300/UC1000/UC3000/ UC10000	Unified Communication Servers
Telepresence	VP86xx Series	Full HD media exchange platform, high-capacity, high stability, especially for operators, large enterprises, government departments and service providers to build a video network
	VP9620/9610	
	TP3106/3118/3006/3016	UC&C product, all-digital video splicing technology to achieve the perfect picture of the life-size widescreen presentation; professional multi-channel acquisition and reduction techniques, a full range of audio and video with
	TP1102 Series	
	RP100 Series	
RP200 Series		
HD Cameras	Box network camera	eSpace IPC2601-P/5601-P

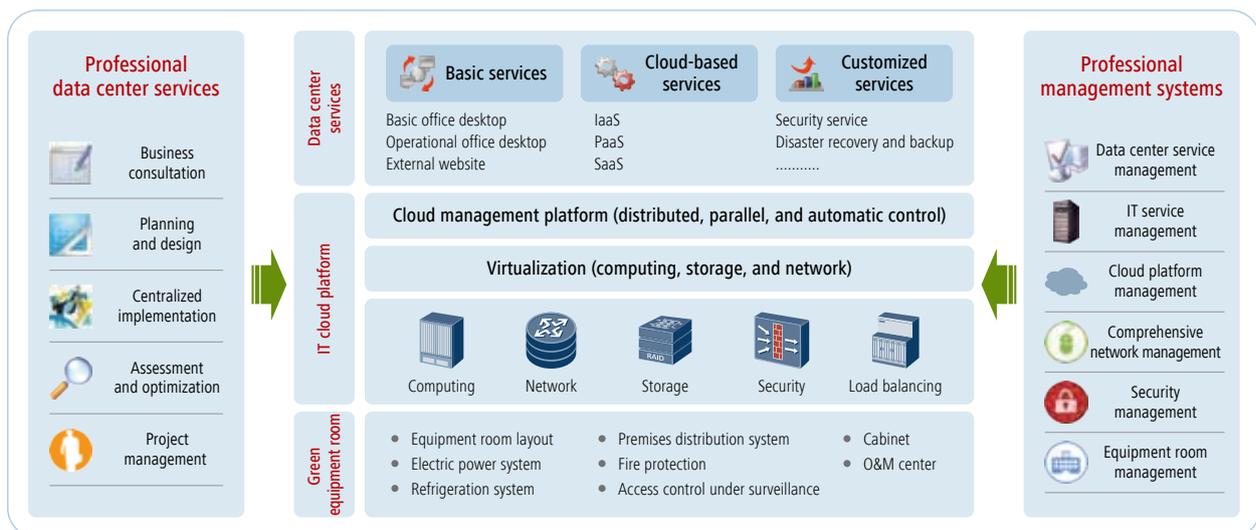
Product Type	Model	Key Features
	HD box network camera	VS-IPCD143C-P/13C-P
	Wide dynamic HD box network camera	VS-IPCH13BM-P
	Semi-dome indoor network camera	eSpace IPC2701-P/5701-P
	Waterproof violation-proof HD semi-dome network camera	VS-IPCH23C-PoE
	Outdoor HD intelligent dome network camera	VS-IPCD33C3 VS-IPCH33C3
SD Cameras	Box network camera	VS-IPC-D11P-P VS-IPC-D12P-P
	Infrared waterproof box network camera	VS-IPC-D11P-IR1 VS-IPC-D12P-IR1
	Wide dynamic box network camera	VS-IPC-H12B-PoE
	Indoor infrared semi-dome network camera	VS-IPC-D22P-IR1
	Indoor violation-proof semi-dome network camera	VS-IPC-D22P
	Indoor wide dynamic violation-proof semi-dome network camera	VS-IPC-H22BP
	6-inch high-speed intelligent dome network camera	VS-IPC-D323/329/325/328
	Outdoor high-speed intelligent dome network camera	VS-IPC-H32BP9 VS-IPC-H315-IR8
Analog Cameras	Box analog camera	VS-CA-D12P VS-CA-H12P
	Infrared box analog camera	VS-CA-D12P-IR1
	Wide dynamic box analog camera	VS-CA-D12BP VS-CA-H12BP
	Indoor semi-dome analog camera	VS-CA-D22P/D21P
	Indoor infrared waterproof semi-dome analog camera	VS-CA-H22P-IR3
	Indoor violation-proof semi-dome analog camera	VS-CA-H22P
	Outdoor intelligent dome analog camera	VS-CA-D323/329/325/314
DVS&DVR	Video recorder	VS-EC-D24R/D28R/D29R
	Video recorder	VS-EC-D19R
	Vehicle-mounted video recorder	VS-EC-D24M
	Video server	VS-EC-D21S/D14S
	Video recorder	VS-EC-H24R/H28R/H29R
	Video server	VS-EC-H21S
Decoder and Decoding Card	Soft-decoding server	VS-DC-D38F
	Decoder	VS-DC-D24
	HD decoder	VS-DC-D24F/D21H
	HD decoder	VS-DC-H21F
	Decoder	VS-DC-H24H/H28H
NVR	Decoder	eSpace DEC6001
	NVR managing a maximum of 16 cameras	SmartNVR 100
	NVR managing a maximum of 128 cameras	SmartNVR 3000

3 Huawei Cloud Data Center Solution



Huawei Cloud Data Center Solution focuses on customer needs and comprehensively integrates its superior resources. The core of the solution is the development and utilization of information resources. It provides a unified technical platform and an IT-based environment to manage the information resources of all service systems used in every link of the oil and gas industry in a centralized manner. The solution effectively facilitates exchanges, sharing, and consolidation of information resources as well as peripheral services, thereby fueling the IT-enabled development of all links in the production, operation, and management processes. All service application systems are aligned with the consistent data standards in order to consolidate the data resources of the independent information systems of oil and gas company HQs and branches. Data in isolated network "information silos" for all business units is integrated, and the data can be saved, analyzed, processed, and transmitted in a unified manner to ensure that the information is fully shared.

3.1 Network Diagram



Focusing on energy conservation, this solution adopts a modular design, incorporates equipment room heat management and cloud computing technologies, and uses an automatic operational management platform. With this solution, Huawei truly helps customers build an operational, maintainable, and scalable value-added service innovation center.

3.2 Highlights

Multi DC:	Unified management of multiple DC; Multi levels DC O&M;light-out Manage;
Fusion:	Integration Cloud management and non-cloud management;
Integration:	Integrated Management and ITSM; ECC large monitoring screen;
Business operation:	efficient business support; self-service, automatic monitoring ; Classification by application of safety management;
Evolution:	"Hardware" Virtual Switch and Policy Control ;Virtual Machine Live Migration;Cloud Platform Offering 400 Gbit/s Ultra Bandwidth;Ultra Desktop Cloud Management;

Availability:	LFR (Loop Free Reliable) Ethernet;Flat Network Without Packet Loss;"Optical + IP" Multi-layer Long-Distance Disaster Recovery Backup;
Pooling:	Horizontal & Vertical Virtualization;Load balancer;VPN Interconnection;Firewall Virtualization;
Visualization:	Unified IP&IT Management;Visualized Topology Management;Graphic Network Stream Analysis.

3.3 Product Index

Product Type	Model	Key Features
Server		
Server	Tecal RH2285	Large-capacity storage, high-performance server products distributed storage, data mining, electronic photo album, video and storage business, and enterprise infrastructure applications
	Tecal E6000	A new generation of carrier-class blade server platform, integrated computing, switching, storage, IO and management functions
Networking		
Router	NE40E-X16	The most powerful core routers with 400G platform, to fullful the coming 10 years requirements.
	NE40E-X8	
	NE40E-X3	High capacity routers with 100G platform
	NE20E-X6	The mature router with high reliability and high performance.
Switch	S9700 Series	High performance aggregation swithes with up to 3.84Tbps.
	S6700 Series	10G aggregation box; The highest 10G port density(up to 48 ports), supporting 96Gbps wirespeed forwarding. It supports stack function(up to 9 boxes stack), to expand capacity and ports.
	S5700 Series	High speed L3 GE access, supporting stack function
Enterprise Security		
Firewall	Eudemon8000E Series	10 Gigabit IPS security gateway, its flexible I / O interface configuration, as well as extensive security operations to protect, to fully meet the user of the data center, ISP and other highly integrated network security, fast response, high-speed processing and long-term security needs.
	Eudemon1000E Series	For the launch of data center unified security gateway
SSL VPN	SVN2000/5000	The secure access gateway for remote access of corporate, government, carriers, mobile office, third-party access, multimedia tunnel access and other security access applications provide a safe overall solution
IDS/IPS	NIP2000	Low-end IDS Monitoring intranets and egress of extranets
	NIP5000	Mid-range and low-end IDS Monitoring intranets and egress of extranets
Cloud OS		
Cloud OS Software	GalaX8800 Standard Edition	Basic features of server virtualization
	GalaX8800 Enterprise Edition	Add resource management compared with standard edition
Unified storage		
Disk storage system	S2200T	High cost-effectiveness: Offers industry-leading hardware and software specifications at the cost of entry-level products.
	S2600T	1. SAN and NAS unified storage 2. High performance: industry-leading hardware architecture, three-layer performance acceleration platform 3. Robust reliability: multiple local data protection technologies and remote disaster recovery technologies 4. Improved effectiveness and enhanced availability: automatic storage tiring, hot-swapping I/O modules
	S5500T	1. SAN and NAS unified storage 2. High performance: industry-leading hardware architecture, three-layer performance acceleration platform 3. Robust reliability: multiple local data protection technologies and remote disaster recovery technologies 4. Improved effectiveness and enhanced availability: automatic storage tiring, hot-swapping I/O modules 5. FCoE and ToE supported
	S5600T	1. SAN and NAS unified storage 2. High performance: industry-leading hardware architecture, three-layer performance acceleration platform 3. Robust reliability: multiple local data protection technologies and remote disaster recovery technologies 4. Improved effectiveness and enhanced availability: automatic storage tiring, hot-swapping I/O modules 5. FCoE and ToE supported

Product Type	Model	Key Features
	S5800T	<ol style="list-style-type: none"> 1. SAN and NAS unified storage 2. High performance: industry-leading hardware architecture, three-layer performance acceleration platform 3. Robust reliability: multiple local data protection technologies and remote disaster recovery technologies 4. Improved effectiveness and enhanced availability: automatic storage tiring, hot-swapping I/O modules 5. FCoE and ToE supported
	S6800T	<ol style="list-style-type: none"> 1. FCoE and ToE supported 2. High performance: industry-leading hardware architecture, three-layer performance acceleration platform 3. Robust reliability: multiple local data protection technologies and remote disaster recovery technologies 4. Improved effectiveness and enhanced availability: automatic storage tiring, hot-swapping I/O modules
	S8100	<ol style="list-style-type: none"> 1. High performance: The SPC1 test result is 300,000 IOPS. The average latency is only 7 ms. 2. Flexible expansion: The bidirectional expansion architecture supports both scale-out and scale-up expansion. The system performance is proportional to the growing number of nodes. A maximum of eight service controller units and 16 data controller units are supported. 3. Comprehensive data protection: The multipathing software intelligently distributes I/O requests and performs switchover, implementing load balancing. The local mirroring technology synchronizes data in real time, ensuring reliability of critical service data.
	Dorado2100	<ol style="list-style-type: none"> 1. High IOPS: The Dorado2100 delivers a performance of up to 100,000 SPC-1 IOPS, which is equivalent to the performance of a storage array consisting of 250 15,000 RPM SAS disks. 2. Access time: The access latency is 600 us, which is only 8% that of traditional disk arrays, consuming less power. 3. Low power consumption: The typical power per performance unit of the Dorado2100 is 350 W, 90% lower than that of traditional storage arrays. 4. Redundancy architecture: The active-active working mode of dual controllers provides a redundancy architecture and concurrent service processing capability, efficiently ensuring service reliability.
	Dorado5100	<ol style="list-style-type: none"> 1. High IOPS: The Dorado5100 delivers a performance of up to 1,000,000 IOPS, which is equivalent to the performance of a storage array consisting of 1400 SAS disks whose rotational speed is 15,000 rpm. 2. Access time: The access latency is 500 us, which is only 5% that of traditional disk arrays. 3. Low power consumption: The typical power per performance unit of the Dorado5100 is less than 110 W/U, 90% lower than that of traditional storage arrays. 4. Redundancy architecture: The active-active working mode of dual controllers provides a redundancy architecture and concurrent service processing capability, efficiently ensuring service reliability.
Storage area network	SNS2120	Stacking of six SNS2100 devices through dedicated stacking cables (for free)
	SNS5120	<ol style="list-style-type: none"> 1. High density: 4 U, 128 ports 2. Stacking: stacking of two SNS5120 devices through four dedicated HyperStack cables
NAS and data protection		
Network Attached Storage System	N8300	<ol style="list-style-type: none"> 1. Support for cluster architecture, scalable to six NAS engines 2. Support for a maximum of 7 PB of storage capacity
	N8500	<ol style="list-style-type: none"> 1. Cluster architecture, scalable to 16 NAS engines 2. Storage capacity scalable to 15 PB
Application storage system	HDP3500	<ol style="list-style-type: none"> 1. Turnkey backup solution: Eliminates multiple procurement contract and service contracts. High cost-effectiveness and energy-saving: Reduces TCO. 2. Comprehensive protection of critical data: Integrates Symantec Backup Exec, protecting critical data on Windows and Linux. 3. Easy management and maintenance: Adopts user-friendly graphical interface.
	HDP3500E	<ol style="list-style-type: none"> 1. Overall data protection, quick data recovery:HDP3500E can provide overall data protection for data centers, branches, and even personal desktop. 2. Easy: Turnkey backup solution: Eliminates multiple procurement contract and service contracts. High cost-effectiveness and energy-saving: Reduces TCO. The innovative device-based and capacity charging mode poses no restrictions on client numbers and application types. 3. Customized: The device consists of different modules, facilitating maintenance. The length of the device is 582 mm, meeting the requirements of a telecom cabinet.
	Backup Software	<ol style="list-style-type: none"> 1. Flexible and competitive data protection solution: Introduces two pieces of backup software to customers. One has the largest marketing share and the other one has the most advanced technology. 2. Integrates backup and archiving, and combines data protection with data management, simplifying management.
	VTL3500	<ol style="list-style-type: none"> 1. Integration design 2. Easy integration and maintenance 3. Effective and intelligent disaster recovery among multiple sites
	VTL6000	<ol style="list-style-type: none"> 1. Industry-leading backup and recovery performance 2. Comprehensive reliability 3. Effective and intelligent disaster recovery among multiple sites

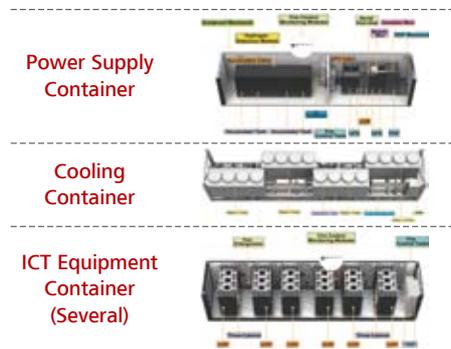
Product Type	Model	Key Features
	VTL6900	<ol style="list-style-type: none"> 1. Leading performance: Provides backup performance of up to 30 TB/h and 588 disk slots (configured with 3 TB of NL-SAS disks). 2. Comprehensive reliability: In a multi-node architecture, the VTL engine supports active-active dual mode and SIR engine supports 2+1 cluster mode. 3. Flexible configuration: Provides multiple architectures, including all-in-one, single node, and multi-node.
	VIS6300	<ol style="list-style-type: none"> 1. Support for virtualization of heterogeneous disk arrays, achieving wide compatibility 2. Support for functions such as snapshot, mirroring, and remote replication in a heterogeneous environment
	VIS6600	<ol style="list-style-type: none"> 1. Support for virtualization of heterogeneous disk arrays, achieving wide compatibility 2. Support for functions such as snapshot, mirroring, and remote replication in a heterogeneous environment
	T3200	<ol style="list-style-type: none"> 1. Energy saving: The T3000 adopts multiple energy saving technologies, greatly reducing power costs. 2. Easy management: Management is simplified by the web graphical user interface (GUI), management functions based on IPMI 2.0, open application programming interfaces (APIs), customizable tasks. The costs of scale deployment, management, and maintenance are reduced. 3. Optimized efficiency: The professionally-designed cloud storage nodes integrate storage and computing, featuring high performance, density, reliability, scalability, and compatibility.
	T3500	<ol style="list-style-type: none"> 1. Energy saving: The T3000 adopts multiple energy saving technologies, greatly reducing power costs. 2. Easy management: Management is simplified by the web graphical user interface (GUI), management functions based on IPMI 2.0, open APIs, customizable tasks. The costs of scale deployment, management, and maintenance are reduced. 3. Optimized efficiency: The professionally-designed cloud storage nodes integrate storage and computing, featuring high performance, density, reliability, scalability, and compatibility.
Cloud storage		
Cloud storage	CSE	<ol style="list-style-type: none"> 1. The multi-tenant technology and comprehensive security measures are adopted to ensure data security. 2. Rich storage policies provide users with the SLA service at different levels. 3. Open APIs are interoperable with various applications. 4. The web disk service supports various types of clients, such as PCs and mobile phones, achieving interaction between multiple terminals and access at any time and any place. 5. The CSS simplifies the backup service management and reduces backup costs.
	CSS	<ol style="list-style-type: none"> 1. The high cost-effective database solution integrates software and hardware, applicable to the archiving of call detail records (CDRs). 2. The data compression ratio reaches 7:1. 3. Data is managed based on its lifecycle.
DC Management		
DC management	ManageOne suite	The ManageOne is an intelligent, efficient, integrated, and convenient operation support platform. It consists of two modules: the cloud service operation system and data center O&M modules. The SSMC optimizes the enterprise IT architecture, improves the O&M efficiency, and helps customers achieve business success.

4 Container Data Center Solution



Container Data Center Solution integrates the power distribution, environment surveillance, cooling system, rack, cabling, fire protection, security, and all other infrastructure sub-systems. Additionally, the solution carries all the IT-enabled sub-systems in Huawei, allows for unified management and hierarchical data maintenance, and guarantees high reliability in business operations.

4.1 Network Diagram



4.2 Highlight

- Flexible configuration**
 This solution supports 18 x 42 U/52U and 19 inch standard rack and various universal servers. It also allows mixed deployment of different sized server racks.
- High-density and user-friendly maintenance**
 The power density of a single cabinet is generally 20 kW/ m² and can be customized to as high as 25 kW/ m². There are 36-inches of front maintenance access and 24-inches of back maintenance access, both of which are within the container.
- Embedded redundancy**
 This solution has a redundant embedded power supply and heat dissipation modules, including the independent power supply to the rack.
- High energy-efficiency**
 This solution provides a small airtight space, with a Power Usage Effectiveness (PUE) rate lower than 1.27.

4.3 Product Index

Product Type	Model	Key Features
Container DC	IDS1000	1. Hot and cold ventilation aisle isolated, shorten the air route to improve the cooling efficiency . 2. Fast deployment without building construction.The data center can run smooth only require connect the cable, pipe and data line after deliver; Build by step, control the initial investment and investment risk. 3. Stable transport properties, support air transport, shipping, road transport with IT, fast deploy the data center to anywhere around the world.
	IDS2000	

5 Huawei eSpace Office Collaboration Solution

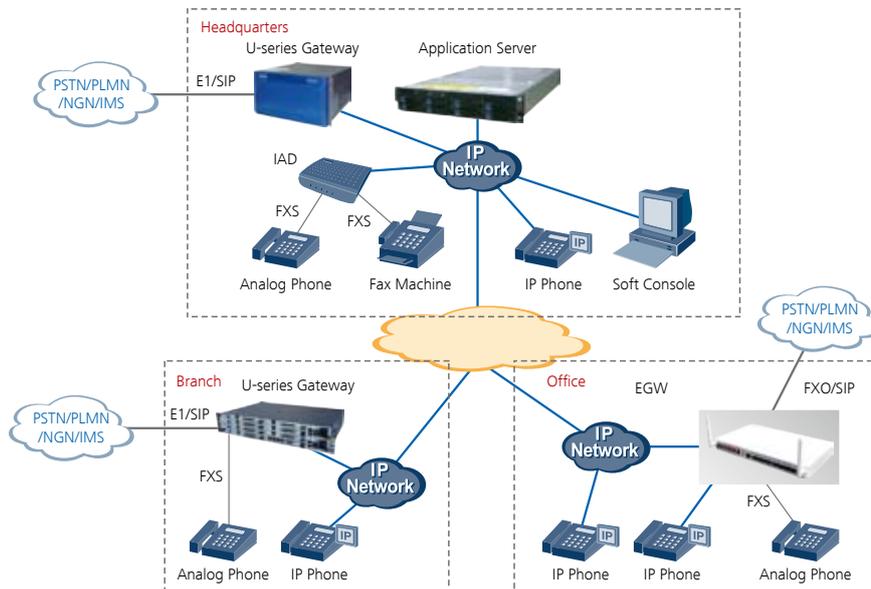


Many energy enterprise operate in a hierarchical structure and build nation-wide or international service centers or offices. In most countries, energy enterprise have built their own office information systems (OIS) for daily office and voice conferences . The rapid development of energy enterprise, imposing higher requirements and expectations on office systems. Meanwhile, the mature ICT technologies, such as cloud services and telepresence, accelerate the application of office collaboration in the energy enterprise.

5.1 IP-based Communication Solution

The IP-based communication solution integrates various services such as voice, video, fax, and unified messaging (UM), and allows terminals to access the system from any place and any time. The solution supports various scenarios, such as cross-regional remote office and service hosting, and meets enterprise requirements for IP-based communication and remote collaboration.

Network Diagram



Highlights

- Series of products: Series of IP PBXs, Series of IP phones, Series of access gateways
- High reliability: Supports geographic redundancy and local regeneration services to ensure service continuity.
- Rich services: Features rich functions such as UM and voice recording.

5.2 Integrated Conference Solution

The integrated conference solution integrates voice, video, and data services. The solution allows users to join the same conference using various terminals, such as telephones, PCs, mobile terminals, HD conference terminals, and Telepresence terminals. With the multi-terminal support, the integrated conference solution improves communication efficiency and reduces costs.

Network Diagram



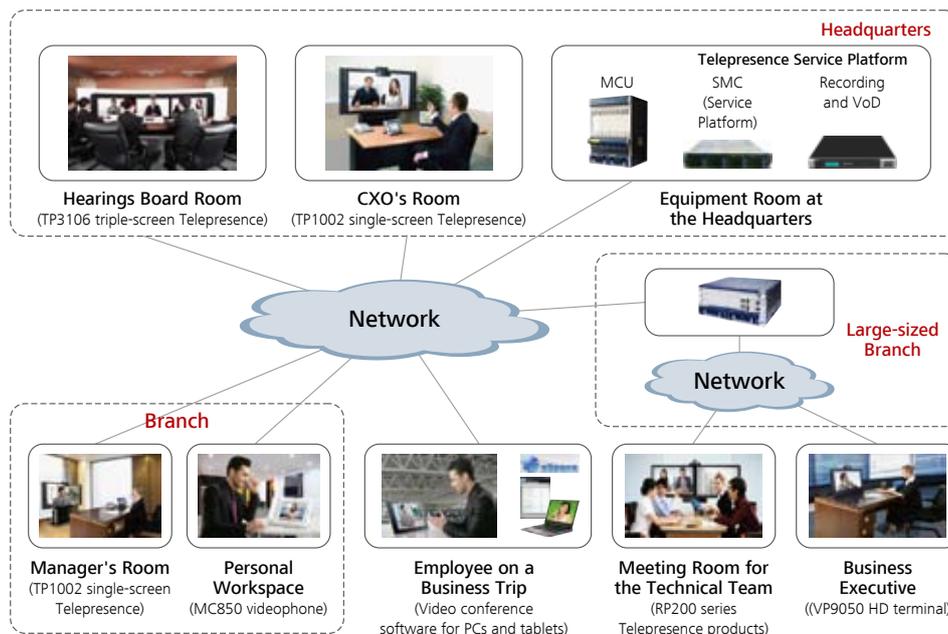
Highlights

- Conferencing from any place and any time
 - Allows analog phones, IP phones, tablets, PCs, and conference terminals to join a conference at the same time.
 - Seamlessly integrates with mainstream HD video conferencing systems such as Huawei's Telepresence.
 - Provides multiple one-click modes for joining a conference.
 - Supports visualized conference management.
- Low bandwidth, high quality, and automatic adaption.
 - Allows users to hold 720P video conferences on common PCs, and occupies no more than 1 Mbit/s bandwidth.
 - Adopts the latest scalable video coding (SVC) technology to automatically transcode videos for PCs, mobile phones, tablets, and IP phones.
 - Automatically adjusts the video bit rate based on the network performance and terminals.
- Powerful collaboration functions and large capacity
 - Allows a user to remotely share applications and view desktops during a web conference, which facilitates the sharing of knowledge and collaboration.
 - Adopts a flexible distributed architecture that supports multiple cascading modes and a large number of concurrent users (more than 5000 for a single conference).
- Easy to deploy and maintain
 - Allows a user to remotely share applications and view desktops during a web conference, which facilitates the sharing of knowledge and collaboration.
 - Adopts a flexible distributed architecture that supports multiple cascading modes and a large number of concurrent users (more than 5000 for a single conference).

5.3 Telepresence Solution

Huawei provides large-sized enterprises with various industry-leading Telepresence products that offer a real life, face-to-face meeting experience to customers while significantly reducing business expenses.

Network Diagram



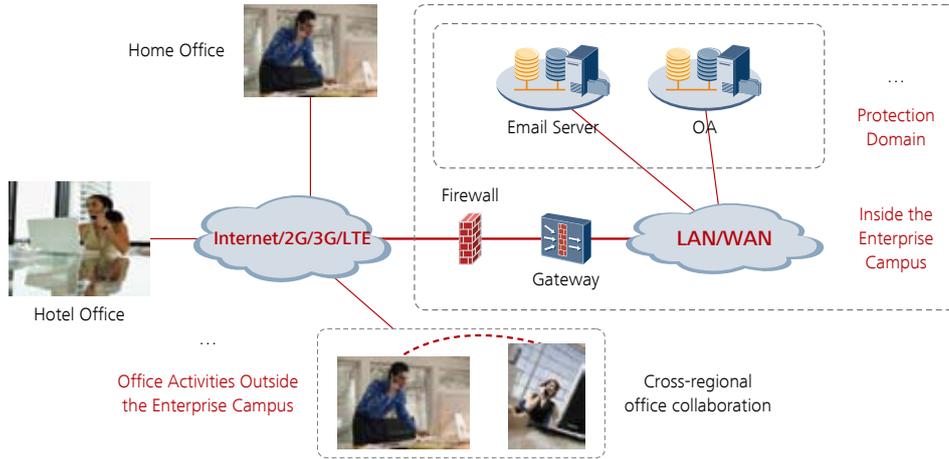
Highlights

- Meets the requirement for face-to-face communication, improves the communication efficiency, and significantly reduces business expenses.

5.4 Remote Office Solution

This solution enables access to the enterprise intranet and collaborative office outside the enterprise campus.

Network Diagram



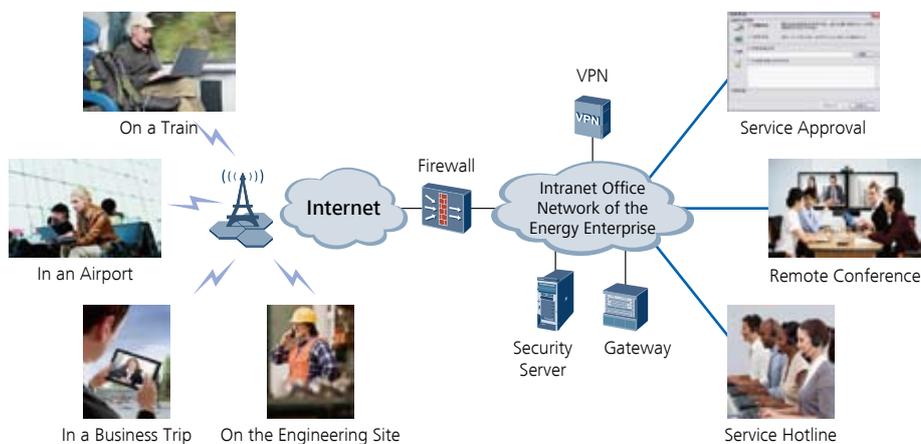
Highlights

- Enables remote office with consistent experiences.
- Provides remote communication and conference, which lowers the enterprise travel cost.

5.5 Mobile Office Solution

This solution adopts centralized system architecture and enables users to access the system by means of wireless public network and Internet. It incorporates various means such as Security Real-Time Protocol (SRTP), password, and fingerprint identification to ensure information security.

Network Diagram



Highlights

- Supports the access from various terminals anywhere at any time.
- Enables mobile service approval and conference access, which significantly improves the administration efficiency.

5.6 Remote Training Solution

The remote training solution provides a unified training platform that covers an enterprise's headquarters and branches, and allows employees to attend training sessions from any place and any time. The solution consists of two components: the remote training platform (eClass) and the resource sharing platform (eCourse).

Network Diagram



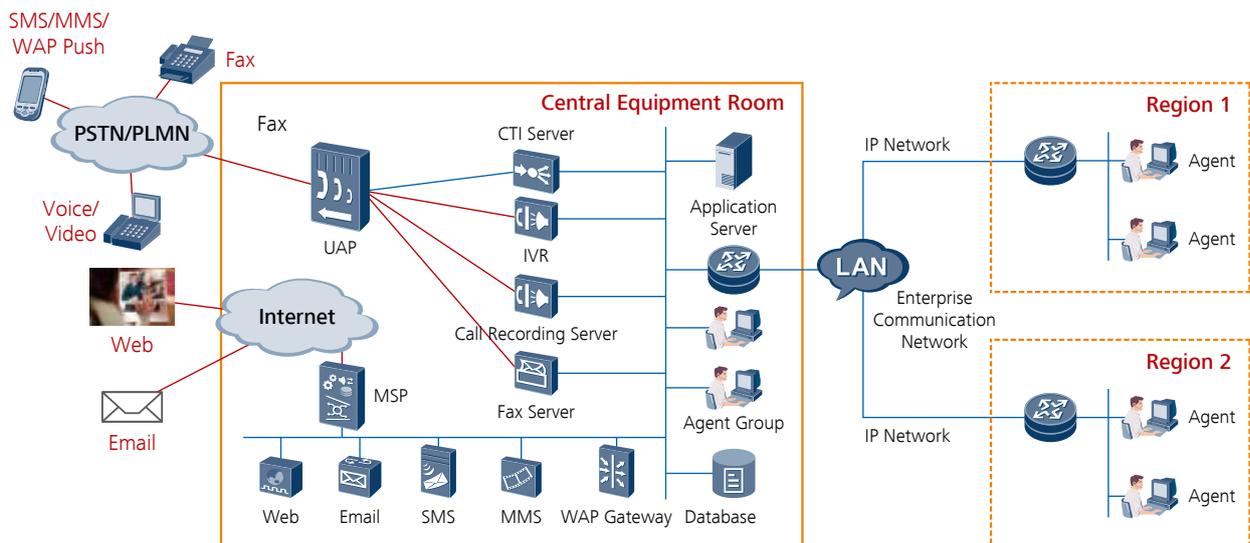
Highlights

- Uses the cloud computing technology to automatically distribute and back up resources among network nodes.
- Supports various terminals, such as PCs, tables, and mobile phones.
- Allows students and teachers to interact in voice and video and share resources.

5.7 Service Hotline Solution

Service Hotline Solution provides quick expert consultation and technical support for the onsite engineers and provides hotline service for employees to help them focus on works and improve the working efficiency.

Network Diagram



Highlights

- Provide various communication modes, including text messages, images, real-time voice, and videos.
- Enables site engineers to report problems quickly and precisely to agents, which significantly improves the service efficiency.
- Reduces cases of false reporting and provides remote expert consultation services for difficult problems, which substantially lower the troubleshooting cost.
- Provide customized professional services and "one-stop" delivery.
- Cloud agent and all-in-one agent solution to realize fast deployment.

5.8 Product Index

Product Type	Model	Key Features
Enterprise Networking		
Switch	Sx700 Series	Campus network convergence for the enterprise network users, access, IDC access and Gigabit , Fast to the desktop, and a variety of scenarios developed by the cassette switch series
Router	AR12/22/32 Series	Set of routing, switching, 3G, voice, security and other functions in a wide range of applications fully meet the business expansion demand
	AR200	
Enterprise UC&C		
Telepresence	VP86xx Series	Full HD media exchange platform, high-capacity, high stability, especially for operators, large enterprises, government departments and service providers to build a video network
	VP9620/9610	
	TP3106/3118/3006/3016	UC&C product, all-digital video splicing technology to achieve the perfect picture of the life-size widescreen presentation; professional multi-channel acquisition and reduction techniques, a full range of audio and video with
	TP1102 Series	
	TP1002/1002S	
	TP1102	
	VP9050	
	RP100 Series	
RP200 Series		
Gateway	EGW1500E	Set of access, wireless, security, voice, ICT used in one
	UGW9500	Set of support interoperability between TIP-based telepresence systems (Cisco TelePresence) and other video endpoints based on different protocols.
eSpace	eSpace IAD132E/32T	IP PBX remote access equipment to provide small and medium-capacity VoIP (Voice over IP) / FoIP (Fax over IP) access
	eSpace IAD1224	
	eSpaceMS2100/3100	Audio, video and data collaboration capabilities
	eSpaceMT1100/2100	SD and HD conference room terminal
	eSpace U2990/ U1980/ U1910	With strong networking capabilities, and call admission seats and media resource function for call center
IP Phone	eSpace 6800	IP telephone terminal
	eSpace 7800	
	eSpace 8800	
	UAP3300	Broadband and narrowband integrated access to a highly integrated media processing: recording, playback, and fax, to close, media monitoring and other capabilities
Enterprise IT		
Server	RH2285	Large-capacity storage, high-performance server products distributed storage, data mining, electronic photo album, video and storage business, and enterprise infrastructure applications
	E6000	A new generation of carrier-class blade server platform, integrated computing, switching, storage, IO and management functions
Enterprise Security		
Unified Threat Management	Eudemon200E Series	Security business needs for small and medium enterprises, the introduction of a new generation of unified security gateway, a firewall, routing, anti-DDOS, wireless (WiFi/3G), intrusion protection (IPS), anti-spam, anti-virus, URL filtering, Internet management VPN features in one
	Eudemon1000E Series	For the large institutions, parks and launch of data center unified security gateway
Data Center Firewall	Eudemon8000E Series	10 Gigabit IPS security gateway, its flexible I / O interface configuration, as well as extensive security operations to protect, to fully meet the user of the data center, ISP and other highly integrated network security, fast response, high-speed processing and long-term security needs.
SSL VPN	SVN300/2230/5530	The secure access gateway for remote access of corporate, government, carriers, mobile office, third-party access, multimedia tunnel access and other security access applications provide a safe overall solution
Terminal		
Smart phone	Honor U8860 Vision U8850	

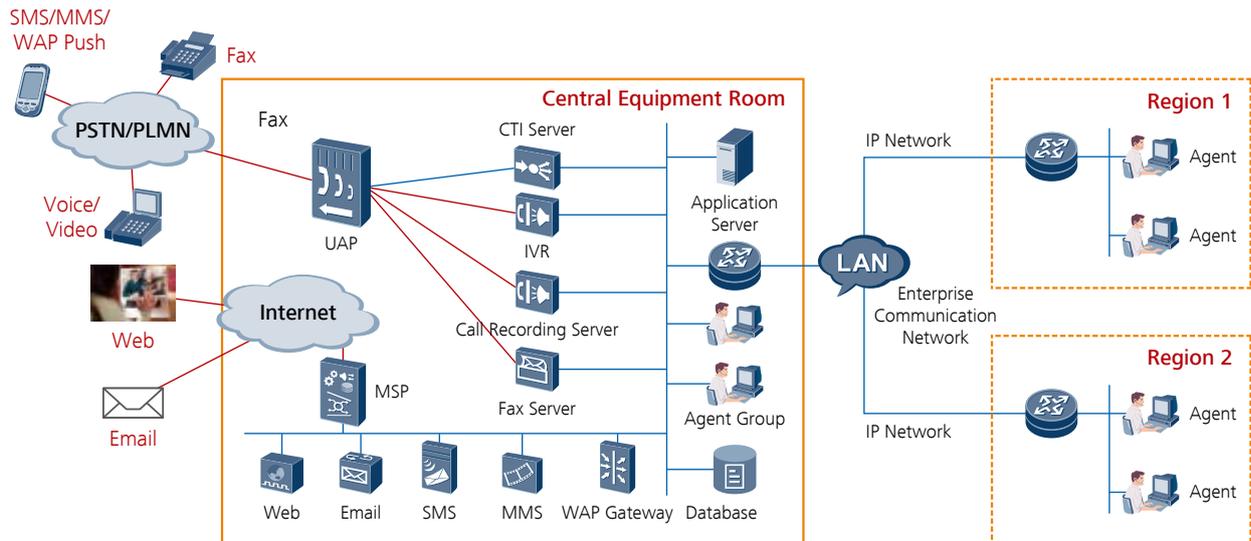
6 Huawei eSpace Customer Service Hotline Solution



Energy enterprise need to satisfy customer requirements and improve customer satisfaction and customer relationship, but these cannot be done by compromising internal operating efficiency. The Huawei eSpace Customer Services Hotline Solution for Energy Enterprise helps energy enterprise reduce operating cost, increase efficiency, improve customer service quality, and create more economical benefits.

Depending on the customer scale and distribution, Huawei can provide centralized deployment solution for small and midsize energy enterprise and distributed deployment solution for large energy enterprise.

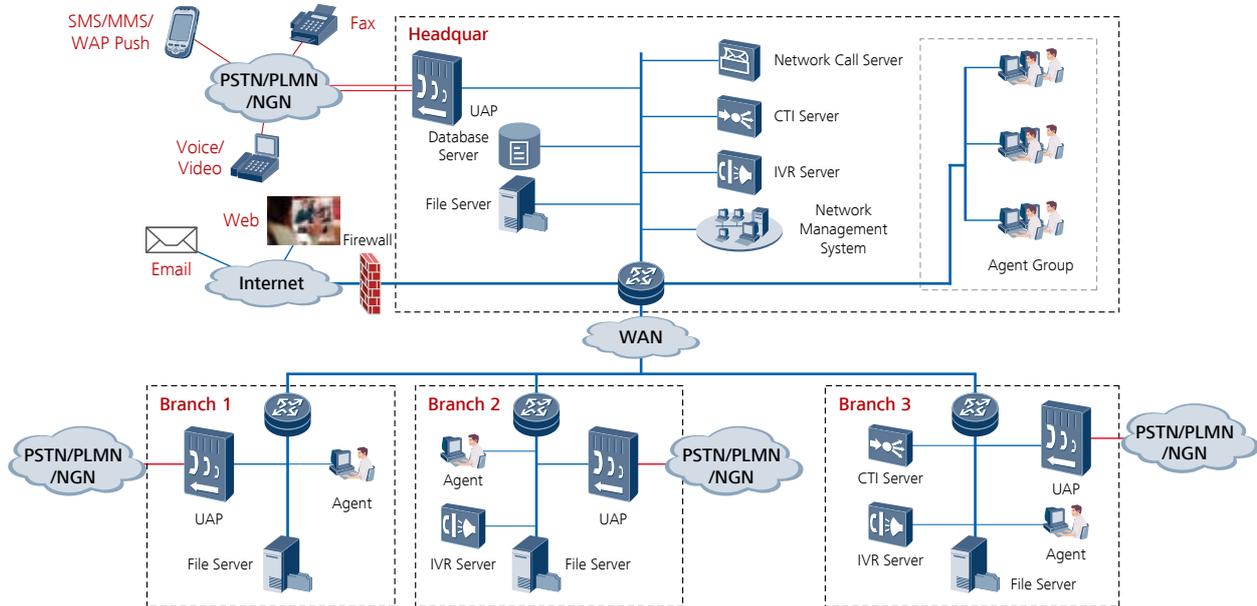
6.1 Centralized Deployment Solution



Highlights

- Unified management and low deployment cost
- IP-based access that enables flexible agent deployment

6.2 Distributed Deployment Solution



Highlights

- Provide interactive communications, i.e. Email, SMS, video, to promote customer satisfaction
- Apply GIS system to speed up locating efficiency
- Support VDN function to virtually divide a physical customer center to service area and repair area
- Multiple access methods. Support centralized or distributed deployments
- Full disaster recovery architecture: redundant centers, local survivable, load balance
- Fast fault detection and switch. Support 7*24 customer response

6.3 Product Index

Product Type	Model	Key Features
Enterprise Networking		
Switch	Sx700 Series	Campus network convergence for the enterprise network users, access, IDC access and Gigabit, Fast to the desktop, and a variety of scenarios developed by the cassette switch series
Router	AR32/22/12 Series	Set of routing, switching, 3G, voice, security and other features in one fully meet diverse application needs of business expansion
	AR200	
Enterprise UC&C		
	UAP3300	Broadband and narrowband integrated access to a highly integrated media processing: recording, playback, and fax, to close, media monitoring and other capabilities
eSpace	eSpace U2990	Powerful networking capabilities, call center call access, seating and media resource function
	eSpace U1980	
	eSpace U1910	
	eSpace IAD132E/32T	IP PBX remote access equipment to provide small and medium-capacity VoIP (Voice over IP) / FoIP (Fax over IP) access
	eSpace IAD1224	

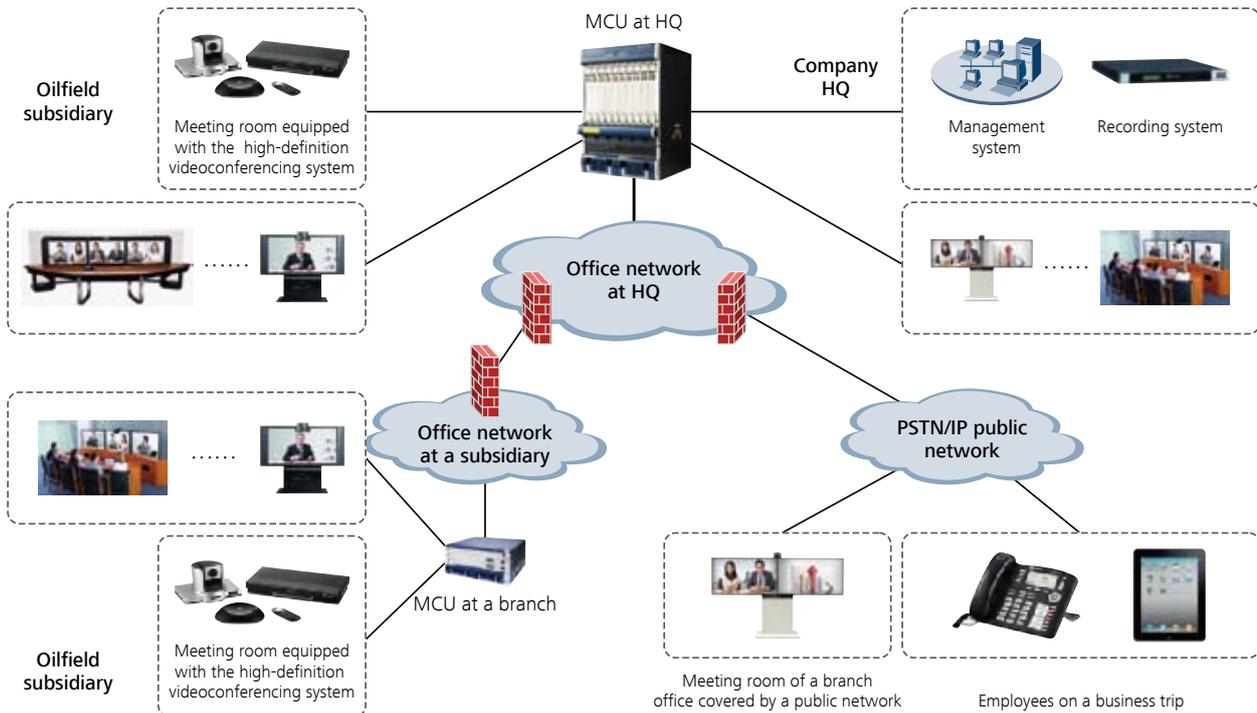
Product Type	Model	Key Features
IP Phone	eSpace6800	IP telephone terminal
	eSpace7800	
	eSpace8500	
	eSpace AT7600	
Gateway	EGW1500E	Set of access, wireless, security, voice, ICT used in one
Enterprise IT		
Server	RH2285	Large-capacity storage, high-performance server products distributed storage, data mining, electronic photo album, video and storage business, and enterprise infrastructure applications and telecommunications business applications
	E6000	A new generation of carrier-class blade server platform, integrated computing, switching, storage, IO and management functions
Storage	OceanStoreS2600	Intelligent storage systems, mainly for the storage of electricity, energy, transportation and other areas of application
Enterprise Security		
Unified Threat Management	Eudemon200E Series	Demand for the security business for SMEs, the introduction of a new generation of unified security gateways, firewall, routing anti-DDOS, wireless (WiFi/3G), intrusion protection (IPS), anti-spam, anti-virus, URL filtering, Internet management VPN features in one
	Eudemon1000E Series	For the large institutions, parks and launch of data center unified security gateway
Data Center Firewall	Eudemon8000E Series	10 Gigabit IPS security gateway, its flexible I / O interface configuration, as well as extensive security operations to protect, to fully meet the user of the data center, ISP and other highly integrated network security, fast response, high-speed processing and long-term security needs.
SSL VPN	SVN300	The secure access gateway for remote access of corporate, government, carriers, mobile office, third-party access, multimedia tunnel access and other security access applications provide a safe overall solution
	SVN2230	
	SVN5530	

7 High-definition Videoconferencing Solution



The High-definition Videoconferencing Solution incorporates a series of advanced technologies which support high definition, eye contact telepresence, multiple audio channels, high fidelity, and low latency. Based on these technologies, this solution integrates voice, video, sharing, collaboration, and a variety of other services. With this solution, oil and gas companies can participate in remote meetings and communication in high definition with clear and crisp transmission. These features allow participants to interact almost just as they would during a face-to-face meeting. This solution enhances communication, lowers operational costs, and improves management efficiency for oil and gas companies.

7.1 Network Diagram



Huawei TP1002 personal telepresence terminals can be installed at company executives' offices. VP9050 desktop systems can be configured in the PCs. Immersive large-capacity conferencing systems like the Huawei TP3016 and TP3118 can be installed in meeting rooms at HQ or large branches, which allows 6 to 16 participants to access a meeting. Small-capacity conferencing systems like the Huawei TP3006 and TP3106 allow up to six participants to access a meeting. Common meeting rooms can be equipped with the Huawei RP series telepresence terminals (such as the Huawei RP100-40 and RP100-55) that allow a large number of people to access a meeting. The central control room must be equipped with a videoconferencing server and such devices as a main control unit (MCU) and a service management center (SMC), such as the Huawei VP8650.

7.2 Highlights

- In-person Experience
 - 1080p60
 - Three-channel audio
 - True-to-life dimensions
 - Impression of making eye contact
- Easy to Use
 - Wireless touch panel
 - One-touch to join a conference
 - User-centered design
- Secure and Reliable
 - Carrier-class design
 - Multiple backup mechanisms
 - 128-bit encryption
- Intelligent Adaptation
 - Super Packet Loss Concealment
 - Intelligent Rate Control
 - Low-bandwidth HD video
- Standard Convergence

- H.323/H.320/SIP
- Excellent convergence and interoperation capability
- Open API
- One-Stop Delivery
 - Environmental design
 - Quick customization

7.3 Product Index

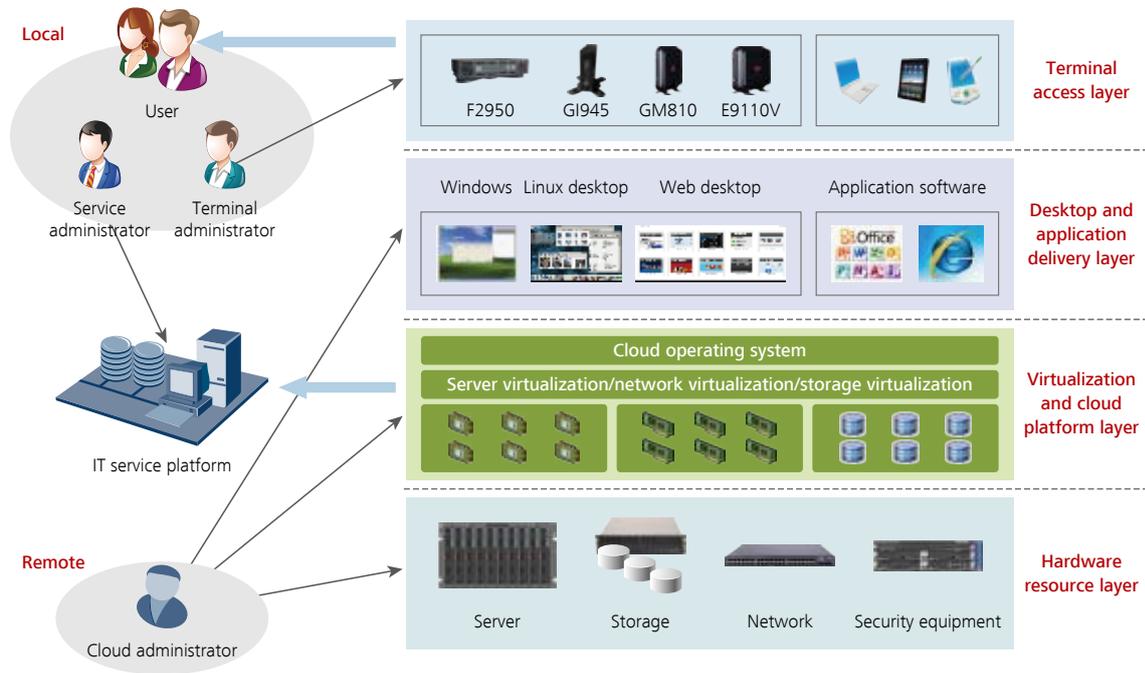
Product Type	Model	Key Features
Telepresence	TP3106/3118/3006/3016	UC&C product, all-digital video splicing technology to achieve the perfect picture of the life-size widescreen presentation; professional multi-channel acquisition and reduction techniques, a full range of audio and video with
	TP1002/TP1002S	
	TP1102	
	VP9050	
	RP100 Series	
	RP200 Series	
MCU	VP8660/8650/8650C	Full HD media exchange platform, high-capacity, high stability, especially for operators, large enterprises, government departments and service providers to build a video network
	VP9620/9610	
Terminal& Peripheral	VP90xx Series	HD and SD video terminal.
	VP80xx Series	
	VPC5xx Series	HD camera.
	VPM210/100	Microphone.
Gateway	UGW9500	Set of support interoperability between TIP-based telepresence systems (Cisco TelePresence) and other video endpoints based on different protocols.

8 Desktop Cloud Solution



Huawei Desktop Cloud Solution covers cloud terminals, cloud hardware, cloud software, network and security, consulting, and integration design services. The solution can be applied in scenarios such as routine work, branches and subsidiaries, design, and R&D. By adopting these solutions, it is possible to achieve centralized sharing of computing and storage resources and unified coordination and management of cloud data centers. In addition, issues brought about by traditional PCs, such as information security, work efficiency, and O&M, may also be addressed. These solutions combined will serve to enhance information security and provide efficient O&M along with flexible means of working.

8.1 Network Diagram



The Desktop Cloud Solution adopts a security architecture that integrates cloud, pipe, and device collaboration so no storage equipment is used at the terminals. This factor guarantees the data security of the desktop cloud system. In pipes, the solution adopts the secure and efficient independent computing architecture (ICA) protocol, with a built-in secure shell (SSH) mechanism, thereby helping to ensure the transmission security of the virtual desktop cloud system. In the cloud, the solution adopts unified user authentication mechanism that authenticates user identities with dynamic digital certificates and supports the access via multiple terminals. While guaranteeing security, the Huawei Desktop Cloud will evaluate, analyze, and optimize network architecture and terminal user behaviors. With mature tools and experience, these features deliver a more consistent and improved service experience (compared with traditional PCs). The solution also adopts visualized management tools, such as Galax cloud management platform and VDesktop virtual desktop management platform, which make it easier for IT O&M personnel to manage the system while reducing the IT O&M costs of oil and gas companies.

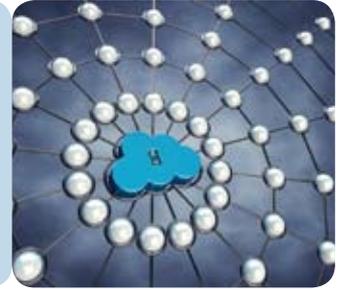
8.2 Highlights

- Security: All-round security protection of intellectual assets
- Flexibility: Access to office anytime, anywhere
- Efficiency: central management and simplified deployment

8.3 Products

Product Type	Model	Key Features
Desktop Cloud	D3	High Security, Superior User Experience, High Deliverability, Low TCO Task-oriented desktop, low bandwidth consumption
	D6	
	D9	
FusionCube	D3	Simple O&M, distributed deployment and more efficient
	D6	
Cloud OS Software	Standard Edition	Basic features of server virtualization
	Enterprise Edition	Add resource management compared with standard edition
	Carrier Edition	Add EC2, VPC, Elastic IP, Charging compared with enterprise edition
Standard Server Consolidation Solution		Approved in carrier application, performance tuned based on mainstream IT application

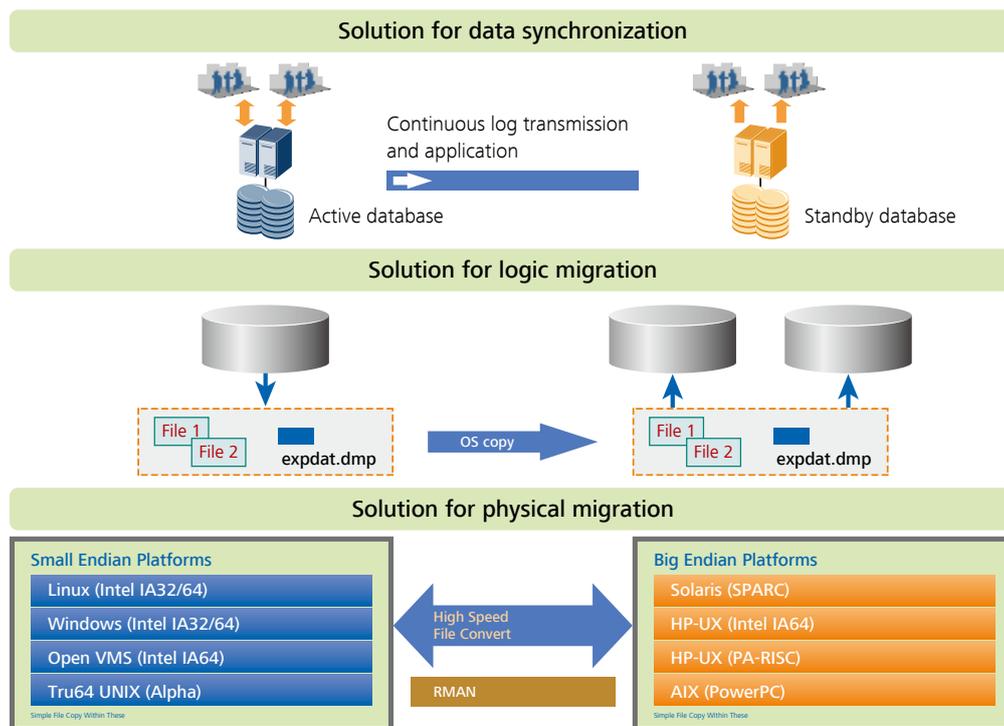
9 Cloud-based Application Solution



The deployment of cloud-based services consists of three steps:

- With standard hardware, the solution builds service cloud platform, evaluate the cloud-based services, integrate and migrate the cloud-based services, and achieve the standardization of cloud-based services.
- By standardizing the cloud-based operations process, the services are operated automatically on the platform and quickly support maintenance and operation.
- With service-based operations, the solution ensure an in-depth service test, rapid go-live deployment, precise service monitoring, flexible resource allocation, and reliable disaster recovery and backup.

9.1 Network Diagram



- Solution for data synchronization: The solution is suitable for scenarios where the downtime is extremely short the data volume is huge. Basically, shutdown in minutes or even seconds is required and the source version must be the same as the destination version.
- Solution for logic migration: The solution is suitable for scenarios where data import and export are required. The shutdown should be in hours. The solution supports heterogeneous migration.
- Solution for physical migration: The solution is a migration method that is suitable for scenarios where a moderate shutdown is required. It supports heterogeneous migration in a certain environment.

9.2 Highlights

- Enhances efficiency by 75%.
The solution simplifies updating and upgrading, enables automatic O&M, reduces the time-to-market (TTM) of software, wins more market opportunities, and bolsters insufficient internal resources.
- Saves costs by 65%.
The solution requires less hardware investment, less software licensing fees, less equipment room and energy consumption, fewer personnel for system maintenance, and less outsourcing cost for IT support.
- Improves reliability by 50%
The solution markedly improves sustainable system operation and reliability.

9.3 Products

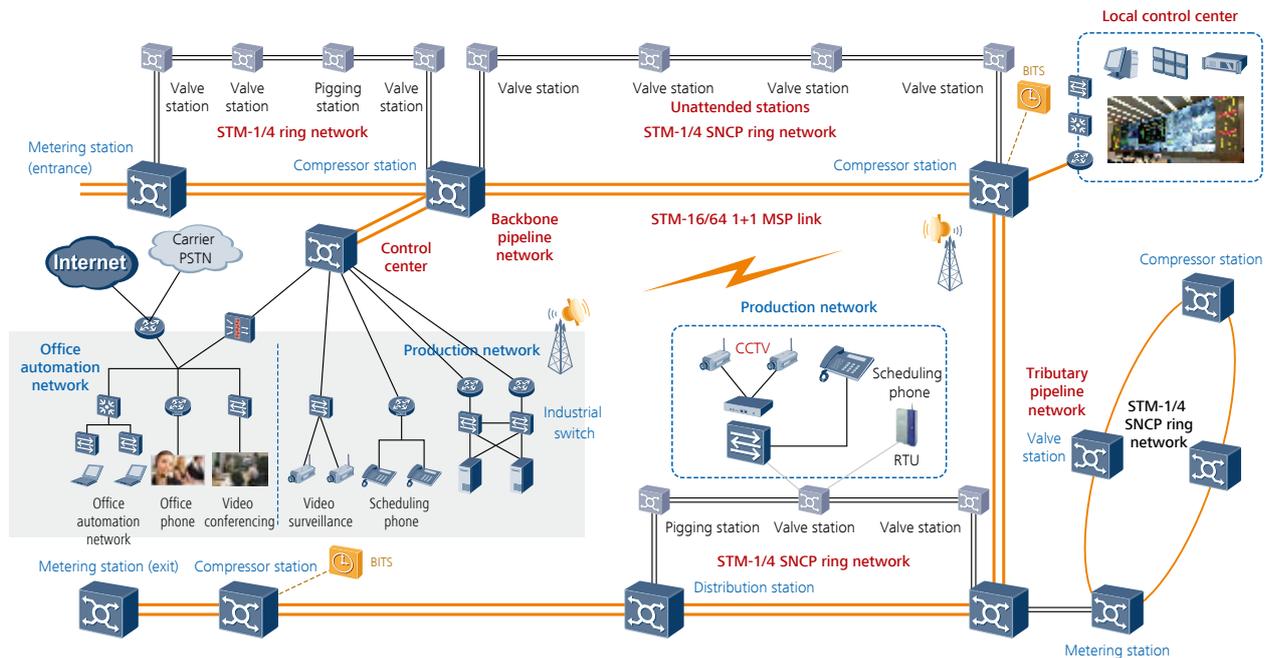
Product Type	Model	Key Features
Services	Service system research	<ul style="list-style-type: none"> • Service system research • Device for information collection
	Solution design for cloud-based evaluation	<ul style="list-style-type: none"> • Methodology for cloud-based evaluation • Device for capacity planning
	Cutover evaluation	<ul style="list-style-type: none"> • Cutover process • Data synchronization • Performance collection and comparison
	migration and deployment trial run	<ul style="list-style-type: none"> • Building the service cloud platform • Process for migration and deployment • Deploy: P2V/V2V • Data backup • Test/Trial run

10 Network Communications Solution for Oil and Gas Pipelines



This Network Communications Solution for Oil and Gas Pipelines incorporates a transmission network, a production network, and an office automation network. The transmission network is a basic network carrying types of services regarding pipeline transportation and production. The production network consists of routers and switches. It controls and transmits SCADA data about production sites in real time. It also carries services like video surveillance and scheduling phone services. The office automation network is a comprehensive campus network. It supports administrative office services in attended stations. It also serves as an output interface to transmit data to the WAN

10.1 Network Diagram



- The transmission network consists of a backbone pipeline network and a tributary pipeline network;
- The production network mainly provides access to SCADA data, video surveillance, and scheduling phones;
- The office automation network consists of data communication devices such as switches and routers;

10.2 Highlights

- Multiple protection modes enable the reliable and prompt transmission of all important services, such as production data, control signals, scheduling services, and surveillance images, to ensure production security.
- Extra long-distance transmission requires fewer relay stations, thereby reducing network construction costs.
- Multiple functions, such as unified network management, end-to-end visualized service management, intelligent alarm analysis, and one-touch fault location, simplify O&M and save on O&M costs.
- Compatible with the live network in order to protect the previous investments of oil and gas companies. smoothly evolving to a higher version to fit in with the deeper IT-enabled development and more advanced services for oil and gas pipeline transportation

10.3 Products

Product Type	Model	Key Features
DWDM/OTN for Transmission Backbone	OSN6800 Series	The large-capacity long-distance optical transmission system; savings from congenital fiber solutions for the evolution of low-cost bandwidth solutions thus derivative is ubiquitous in the enterprise trunk solutions, integrated 40G/100G, large-capacity OTN photoelectric
	OSN8800 Series	
MSTP/Hybrid MSTP	OSN 3500	The leading MSTP optical transmission systems with the advanced character as ASON, 380km super long, hybrid mode, internal WDM and 1588v2.
	OSN 7500	
Microwave	RTN 980/950/910/905	The only integration of TDM/Hybrid/Packet IP microwave transmission systems that colligates Huawei leading technology in IP, wireless and optical transmission.
Core & Aggregation Router	NE40E-X8/X16	The most powerful core & aggregation routers with 400G platform, to fullful the coming 10 years requirements.
Access Router	NE40E-X3	High capacity access routers with 100G platform
	NE20E-X6	The mature access router with high reliability and high performance.

Product Type	Model	Key Features
Voice & Security Router	AR 32/22/12 Series	Integration of routers, voice and security gateway.
Security Gateway	Eudemon 200E-X	Integration of routers, switches, wifi, voice and FW, with advanced firewall functions and UIM expanding capacity. The future security products with IPv6 ready.
	Eudemon 1000E-X	
	SVN3000	
Core Switch	S9700 Series	High performance aggregation switches with up to 3.84Tbps.
	S7700 Series	High performance aggregation switches with up to 2Tbps switching capacity, supporting cluster to expand ports and capacity.
Aggregation Switch	S6700 Series	10G aggregation box; The highest 10G port density (up to 48 ports), supporting 96Gbps wire-speed forwarding. It supports stack function (up to 9 boxes stack), to expand capacity and ports.
	S5700 Series	Campus network convergence for the pipeline access network; Fast to the desktop, and a variety of scenarios developed by the cassette switch series.
	S3700 Series	
WLAN AP	AP6510DN-AGN	Outdoor dual-brand AP, RJ45, and POE power supply
	AP6610DN-AGN	Outdoor dual-brand AP, SFP, and AC power supply
WLAN AC	ACU card in S9300/S7700	The service unit integrated in S9700 or S7700, as an AC providing wireless service on large or medium-scale oil & gas field networks.
	AC6605-26-PWR	The high-end access controller developed by Huawei integrates 1000M Ethernet switch functions to implement wired and wireless access.
Security Gateway	Eudemon 200E-X	Integration of routers, switches, wifi, voice and FW, with advanced firewall functions and UIM expanding capacity. The future security products with IPv6 ready.
	Eudemon 1000E-X	
	SVN3000	
NMS	iManager U2000	NMS for WAN, with unified management platform for Transport, IP, access, and third-party IP devices.
	eSight	The campus network NMS with IP/IT unified management platform

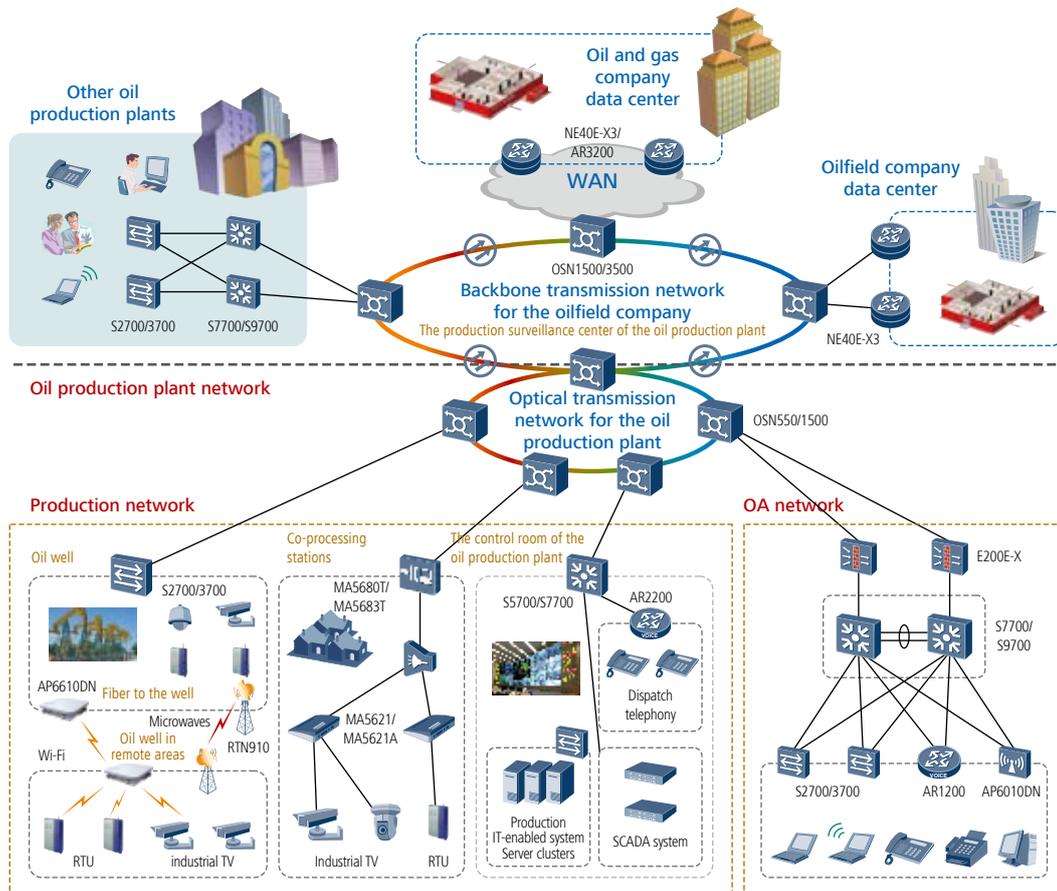
11 Network Communications Solution for Oilfields



Huawei Network Communications Solution for Oilfields is comprised of three parts:

- Backbone transmission network: Consists of Huawei MSTP equipment, and connects oilfield HQ and branches such as oil production plants, exploration and exploitation companies, and research institutes.
- Production network: Uses Wi-Fi or microwaves for production data backhaul from remote oil and gas wells. Builds an optical network with GPON equipment and industrial switches for fiber to the well and to stations with personnel such as the central control room and processing stations. Physically isolates production services (industrial TV, SCADA system, dispatch telephony, etc.) by using access switches. Deploys firewalls at the egress for secure access to the office automation (OA) network, ensuring information security and service isolation of oil and gas companies.
- OA network: Covers work stations with personnel such as the central control room and processing station, and uses a hybrid network (AR G3 routers, indoor WLAN devices, S series switches, etc.).

11.1 Network Diagram



11.2 Highlights

- High reliability
 - Device-/Network-class protection mechanisms that comply with industrial standards.
 - 50ms switchover for IP services
 - Redundant network architecture
- Wireless
 - Wi-Fi + Microwave, offer huge capacity
 - Data Uploading in Long distance
 - Free frequency band
 - Easy to deploy
- Multi-service bearer
 - Bearing voice, video and data services on the same net
 - AR G3 highly integrated routing, PBX, firewall and other functions
- Real-time communication
 - Low latency, fast convergence, Lossless
 - Large bandwidth to provide real-time HD video services
- Industrial class
 - Various industrial products (AP/PON/Switch)
 - Green design for energy saving
 - Adapt to the harsh environment

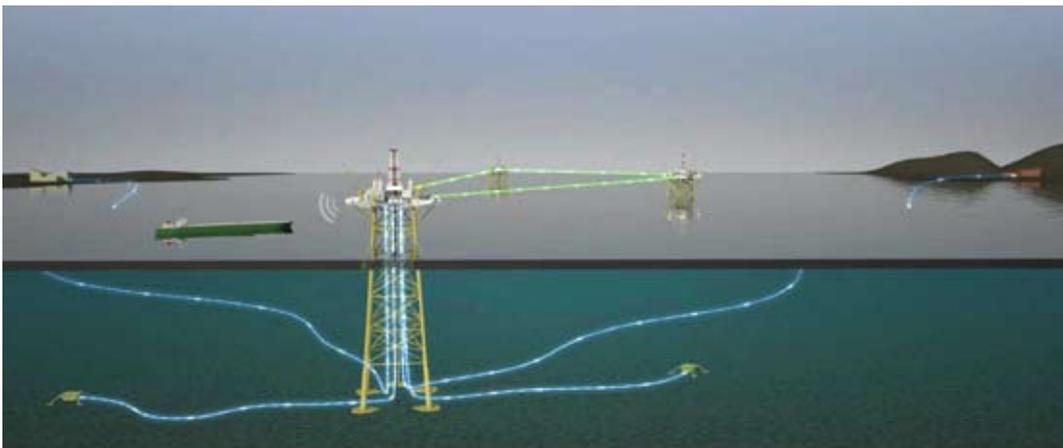
11.3 Products

Product Type	Model	Key Features
MSTP Transmission	OSN 500/550	Hybrid MSTP with 7Gbps packet forwarding and 20G SDH transmission, providing enough flexibility.
	OSN 1500	Hybrid MSTP with 7Gbps packet forwarding and 20G SDH transmission, providing enough flexibility.
XPON Access	MA5680T/5683T	The high performance xPON OLT that supports P2P access and IP/MPLS.
	MA5621/5621T	The industrial xPON ONU, to adapt oilfield harsh environment.
Access Router	NE40E-X3	High capacity access routers with 100G platform
	NE20E-X6	The mature access router with high reliability and high performance.
Voice & Security Router	AR 32/22/12 Series	Integration of routers, voice and security gateway.
Security Gateway	Eudemon 200E-X	Integration of routers, switches, WiFi, voice and FW, with advanced firewall functions and UIM expanding capacity. The future security products with IPv6 ready.
	Eudemon 1000E-X	
	SVN3000	
Core Switch	S9700 Series	High performance aggregation switches with up to 3.84Tbps.
	S7700 Series	High performance aggregation switches with up to 2Tbps switching capacity, supporting cluster to expand ports and capacity.
Aggregation Switch	S6700 Series	10G aggregation box; The highest 10G port density (up to 48 ports), supporting 96Gbps wire-speed forwarding. It supports stack function (up to 9 boxes stack), to expand capacity and ports.
	S5700 Series	High speed L3 GE access, supporting stack function, as the campus network convergence for the oilfield network access.
	S3700 Series	High speed L2 100M access, supporting stack function, as the campus network convergence for the oilfield network access.
WLAN AP	AP5010SN-GN	Basic indoor single brand AP
	AP5010DN-AGN	Basic indoor dual brand AP
	AP6510DN-AGN	Outdoor dual-brand AP, RJ45, and POE power supply
	AP6610DN-AGN	Outdoor dual-brand AP, SFP, and AC power supply
	AP6010SN-GN	Enhanced indoor single-brand AP
	AP6010DN-AGN	Enhanced indoor dual-brand AP
	AP7110DN-AGN	Indoor 3x3 MIMO single-brand AP, with 450Mbps capacity
	AP7110SN-DN	Indoor 3x3 MIMO dual-brand AP, with 900Mbps capacity
WLAN AC	ACU card in S9300/S7700	The service unit integrated in S9700 or S7700, as an AC providing wireless service on large or medium-scale oil & gas field networks.
	AC6605-26-PWR	The high-end access controller developed by Huawei integrates 1000M Ethernet switch functions to implement wired and wireless access.
Security Gateway	Eudemon 200E-X	Integration of routers, switches, WiFi, voice and FW, with advanced firewall functions and UIM expanding capacity. The future security products with IPv6 ready.
	Eudemon 1000E-X	
	SVN3000	
NMS	iManager U2000	NMS for WAN, with unified management platform for Transport, IP, access, and third-party IP devices.
	eSight	The campus network NMS with IP/IT unified management platform

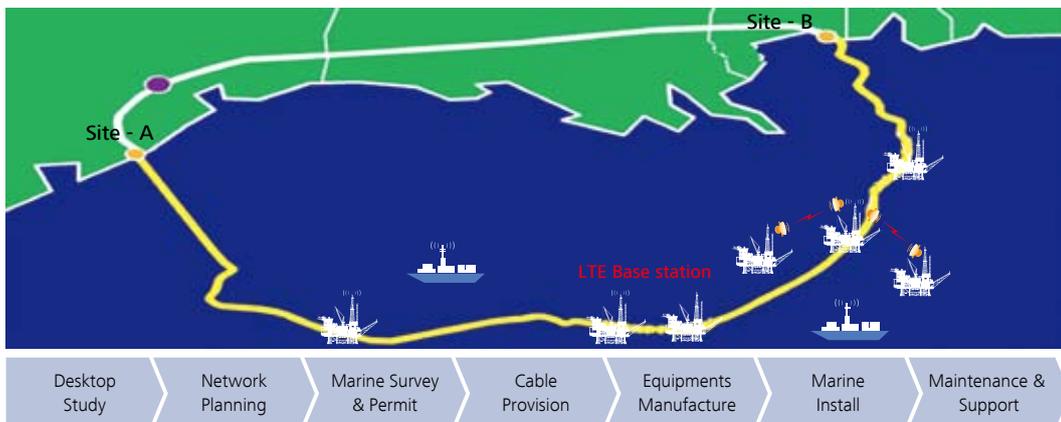
12 Submarine Cable Solution for Offshore Oilfields



Huawei Submarine Cable Solution for Offshore Oilfields is an end-to-end solution that provides desktop design, route survey, network design, equipment delivery, engineering installation, testing, and training services. This solution has adopted multiple technologies to provide high-bandwidth and long-hop communications transmission and support multi-service access, such as STM-16/64256 and GE/10GE LAN/WAN. Deployment of standard cabinets and sub-racks enables convenient expansion. Unified network management is provided for both terrestrial and submarine network equipment, which keeps the maintenance costs relatively low. Back up design for equipment, networks, and power systems as well as Zone 4 anti-quake capability promise high system reliability. Well-established processes and teams ensure smooth ongoing operations regarding construction quality and progress. The figure below shows the Huawei Submarine Cable Solution Architecture for Offshore Oilfields.



12.1 Network Diagram



- State-of-the-art technologies adopted in innovative products of submarine cable system.
- Experienced project management ensure the timeliness and quality of delivery.
- Leading procurement flow enables best material sources and first-class subcontractors.
- Advanced supply chain management ensures reliable products and timely consignment.

12.2 Highlights

- State-of-the-art technologies adopted in innovative products of submarine cable system.
- Experienced project management ensure the timeliness and quality of delivery.
- Mature industrial chain can provide the optimal solution for Oil & Gas industry.
- Provide customized solution, according to customer's special requirements

12.3 Products

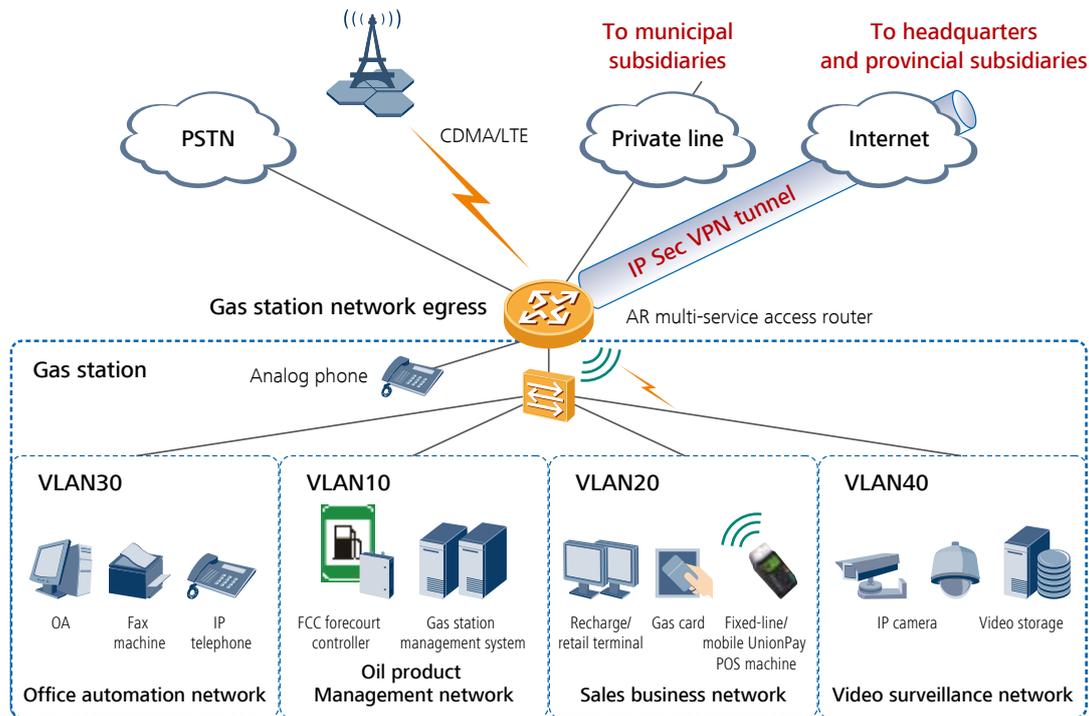
Product Type	Model	Key Features
Wet Plants		
Cable	Trunk Cable	Light Weight Protected (LWP); Light Wire Armored (LWA); Single Armor (SA); Double Armor (DA); Rock Armor (RA);
	Jumper Cable / flying leads	Subsea jumper for use with subsea fibre optic and electrical connectors.
	Static riser Cable	Special cable, Static riser cables for fixed platforms
	Dynamic riser Cable	Special cable, Dynamic riser cables for floating platforms for the last section from the seabed to the platform itself
Subsea Termination	Underwater Terminating Assemblies (UTAs) / Subsea fiber distribution canisters (FDC)	The overall function of the Riser Seabed Termination Node (UTA) is to enable quick and reliable connection to the riser cable.
	Cable Termination Assembly(CTA) / deployment pallets (DP)	The static cables will also need to be terminated (CTA) with a wet mate connector interfaces for ROV assisted connection.
	Flying Lead/ Jump cable	Minimum and maximum length of flying leads.
RPT	HMN RPT 1660	RPT 1660 adopts the erbium-doped fiber amplification (EDFA) technology.
BU	HMN BU 1650	BU 1650 Branching Unit allows the connection of three or more different cables in a predetermined manner
Dry plants		
SLTE	uawei OptiX BWS 1600S	Submarine Line Terminal Equipment
PFE	Spellman PFE	Feeding Equipment
NME	Huawei OptiX iManager U2000	Network Management System
SLM	HMN SLM 1630	Submarine Line Monitor

13 Network Communications Solution for Gas Stations



The Huawei Network Communications Solution for Gas Stations uses Huawei's third-generation access routers, AR G3 series, as the network egress for gas stations. These routers deliver high performance to support and integrate OA, oil product management, retail, surveillance, and other services. The solution also deploys the eSight network management system to unify and streamline O&M of network services at each station.

13.1 Network Diagram



This solution provides gas stations with voice and data services through Huawei AR multi-service access routers. Through controlling quality of service (QoS), this solution supports an OA network with higher bit rate than normal Internet. As firewall, Internet protocol security (IPSec), and other functions are integrated into the AR routers, this solution also provides value-added convergence services for gas stations that can enjoy diversified services at low costs.

13.2 Highlights

- Industry-leading Performance IPSec VPN
 - Highest-level performance (200 Mbit/s) in the industry
 - Built-in hardware encryption
 - Single link and multiple IPSec tunnels
- High Integration High Cost-Effectiveness AR 200 Series
 - High integration: egress router, switch, VoIP, and firewall
 - High cost-effectiveness: This solution minimizes IT investments made for devices due to built-in services, ports and not need to purchase expansion cards.
- 100 Times WAN Application Acceleration
 - Bandwidth occupancy is reduced by 60%-95%.
 - Applications are accelerated by up to 100 times.
 - The maximum number of data packages is reduced by 98%.
- Standardization 3G Wireless Access
 - Complete compatibility with WCDMA/CDMA2000.
 - Seamless evolution to 4G LTE network
 - Multiple link redundancy modes

13.3 Products

Product Type	Model	Key Features
Multi-services Router	AR3260	The branch access routers series, with switching, 3G, voice, security and other functions, deployed in company headquarter.

Product Type	Model	Key Features
	AR2240/AR2220	The branch access routers series,with switching, 3G, voice, security and other functions, deployed in big gas station(50~100 employees)
	AR1220 Series	The branch access routers series,with switching, 3G, voice, security and other functions, deployed in small gas station(dozen employees)
	AR200 Series	The branch access routers series,with switching, 4G, voice, security and other functions, deployed in small gas station(less than 10 employees)
Access Switch	S1700 Series	Access switch with low consumption and multiple function.
NMS	eSight	The network NMS with IP/IT unified management platform

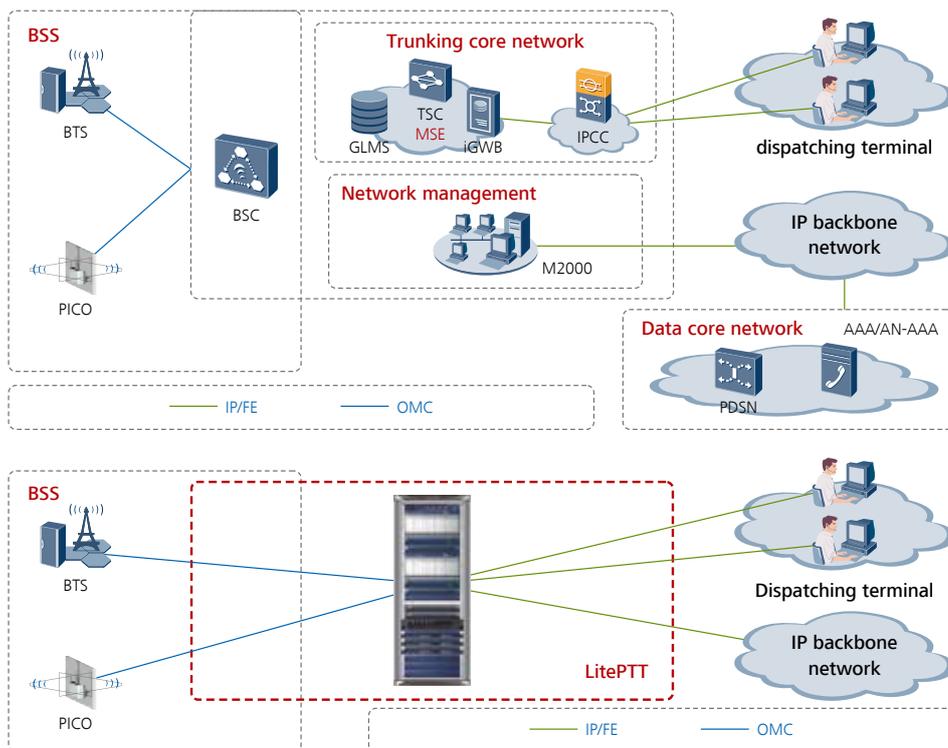
14 Private Wireless Network CDMA Solution



Huawei Private Wireless Network CDMA Solution provides broadband wireless network coverage in oil and gas fields, and the terrains of the pipelines, where blast-resistance terminals are deployed. By carrying voice and multimedia services, the solution provides oil and gas companies with convenient, efficient, and secure command and dispatching, high-speed data transmission, wireless video surveillance, and location-based services. All of these services help customers cut down their network construction costs, improve productivity, and raise operational efficiency.

14.1 Network Diagram

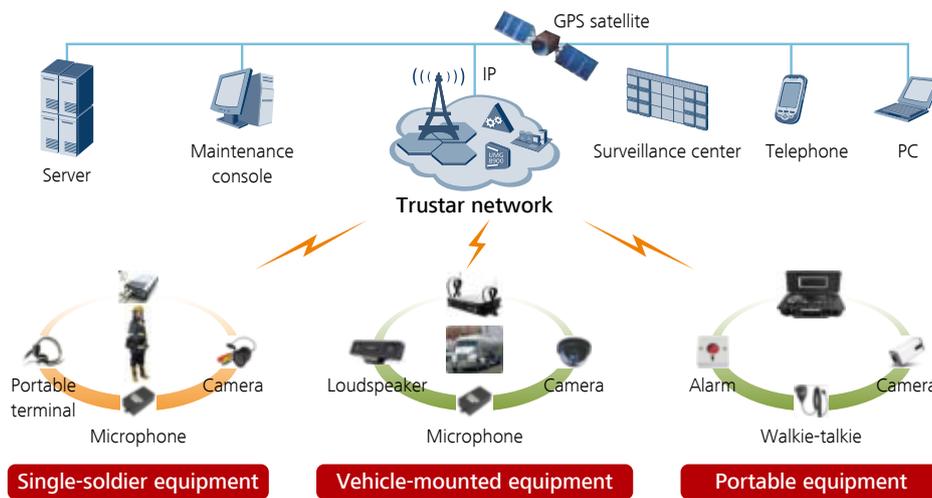
Command and dispatching:



The command and dispatching trunking system mainly includes a CDMA base station subsystem (BSS) and a cluster core network subsystem with a multimedia service engine (MSE). The system provides such cluster communications functions and utilities as group call, broadcast call, scheduling console, call control, and floor control while it also supports services like duplex call and high-speed data transmission. Personnel at the command center schedule tasks and instruct workers to perform multi-functional tasks through the scheduling console, thereby meeting the scheduling and collaboration requirements in the production at oilfields and patrols alongside pipelines.

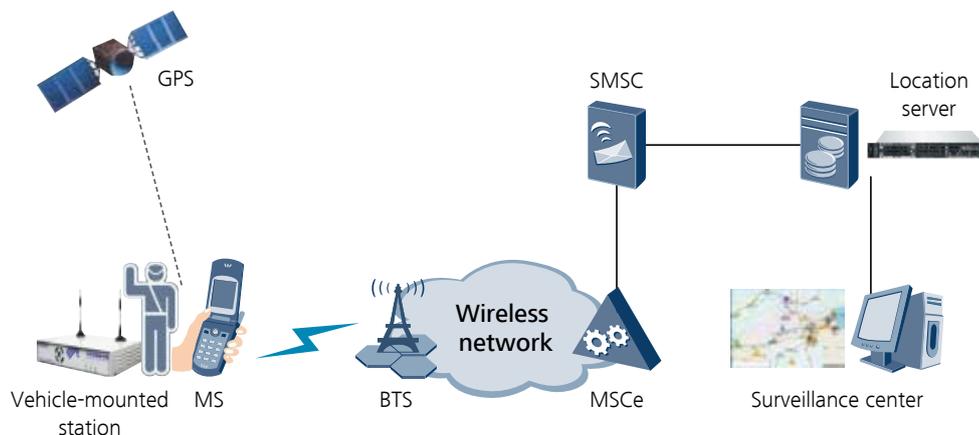
In the event that the number of system users in an enterprise is small (e.g., below 1000), we provide small-sized "six-in-one" cabinets which occupy little space and can be easily installed. Such small cabinets provide the same cluster scheduling functions as those of full-sized cabinets but cost less in network construction. These cabinets are an ideal choice for oil and gas companies who need to construct a small-scale cluster communications network.

Wireless video surveillance:



Wireless video surveillance is conducted with three types of equipment: single-soldier, vehicle-mounted, and portable devices. When workers patrol oil wells, production equipment, pipelines, and stations, they carry CDMA-enabled single-soldier or portable cameras to take photos or shoot videos. They then upload the pictures and videos to the surveillance center in real time via the CDMA wireless network. Vehicle-mounted equipment includes cameras and CDMA-enabled wireless video servers, with which personnel in vehicles shoot videos in oilfields and alongside pipelines and upload the videos via the CDMA wireless network in real time.

Location service:



This service is realized by combining the global positioning system (GPS), GIS, and CDMA technology. Users manage location information through a management center and positioning terminals. With the location service system, oil and gas companies can pinpoint the location, speed, and status of patrols and vehicles in wilderness and other areas so that nearby resources can be scheduled to quickly respond to threats or dangers. This system also immediately sends and receives alarms and notifies authorities if emergency response services are required.

14.2 Highlights

- Convenient
 - Voice Service
 - Multimedia Service
 - Internet Service
- Effective
 - Underground Office
 - Attendance Administration
 - Push to talk
 - Command and Dispatch
- Security
 - Accident rescue
 - Underground Precise Positioning
 - Video surveillance
 - Underground Key Data Upload

14.3 Products

Product Type	Model	Key Features
Wireless basic system equipments		
BSC	BSC6680	The BSC6680 product of the new generation uses the newest next-generation platform for the base station controller, that is, the platform of advanced radio controller (PARC). The BSC6680 also uses advanced technologies of the industry and future-oriented designs. It provides multiple excellent functions. The BSC6680 has the following features: 1High reliability, Large capacity, 2Abundant interfaces, 3Ultra-high integration and ultra-low power consumption, 4Flexible configuration and convenient maintenance, 5 High-performance IP central switching network, 6Flexible and excellent All-IP networking capability
RAC	RAC6690	The RAC6690 product is very similar with BSC6680, but RAC6690 also has Interworking function (IWF)
	RAC6610	1High reliability, Large capacity, 2Abundant interfaces, 3Ultra-high integration and ultra-low power consumption, 4Flexible configuration and convenient maintenance, 5 High-performance IP central switching network, 6Flexible and excellent All-IP networking capability, 7 Interworking function (IWF)
BTS	BTS3900	Base station used in indoor surrounding
	DBS3900	Base station used in both indoor & outdoor surroundings, compare with BTS3900, DBS3900 less use FUM board
Trustar 7.0 solutions		
trunking communications	MSE9830	The MSE9830 includes four primary parts: trunking switching center (TSC), GLMS server, iGWB server, and BAM server. The TSC is responsible for the call processing and media forwarding. The GLMS is responsible for the saving of user, group and VPN data and the authentication of users. The iGWB is responsible for keeping the communication of the bill and the charging system. The BAM is responsible for the data configuration and the maintenance.
	UAP3300	The UAP3300 (here, the UAP is short for the Universal Access Platform) is the access device of the multimedia contact center. The UAP3300 provides the functions of the call access, agent, and media resource for the Internet Protocol Call Center (IPCC), supports the interconnection with the Computer & Telephony Integration (CTI) platform, and provides manual services and automatic IVR services.
end to end encryption	IC card reader& writer	use external type, CRW-II IC card Reader&Writer, through USB connected with the server.
	Cypte-module writer	through USB connected with the client, and we can operate the writer by the software on the client
	KDC	key distribute center(KDC) is installed in the IBM System x3650 Type 7979 server.
	EMU	EMU(encryption module unit), the size is 20mm×18mm×2.7mm
video surveillance	surveillance center software platform	software can achieve the functions of Business control & manage, media stream stores & forwards

Product Type	Model	Key Features
	camera	various cameras: portable camera, vehicle mounted camera, emergency camera, fixed camera, also HD camera
	front end surveillance sub-system	it most used in vehicles the main features include acquisition video, audio, alarm information, etc. it changes analog signal through the video encoder chip for coding h.264 formats, and transmit back to platform by cdma network.
SMEs solution	LitePTT	The LitePTT is configured with only one N68E-22 cabinet that integrates the RAC, SMC, TSC, GLMS, UAP, CTI, PDSN, and AAA to provide common voice services, trunking services, and high-speed data services.
	BTS3602B TruStar(PICO)	The BTS3602B can be deployed indoors and outdoors to improve coverage quality and network capacity. The BTS3602B has a small size, facilitating its deployment and installation. It has the following advantages for operators: <ul style="list-style-type: none"> • Easy site locating • Easy network planning and optimization • Rapid network construction • Low manpower, power and space consumption • Low Total Cost of Ownership (TCO)
TrunkSite solution	TrunkSite	In the TrunkSite solution, all parts, such as base stations, antennas, power supply, supports, and accessories are placed in a dedicated protective case, which is convenient for transportation, handling, and watertight. The TrunkSite solution is based on site communication characteristics. The site communication characteristics can be demonstrated by installing a CDMA Isolated-Site Trunking Controller (CITC) in a common base station. In this way, the base station can provide trunking communication services in its coverage without the need to connect to the BSC. The TrunkSite can be deployed easily and rapidly with existing site communication technology and has functions, such as professional group call and trunking private call. In addition, local maintenance and registration can be performed on the TrunkSite.
LBS solution	TruStar Location Server	The location server stores the location information of terminals and e-maps. The location server has the following characteristics: <ul style="list-style-type: none"> • Provides an open interface, facilitating third party clients to connect to the interface. • Processes the location information of 100,000 subscribers simultaneously. • Provides security to systems by encrypting messages based on the AES algorithm. • Enables customers to set a location data storage period. However, the amount of data cannot exceed the maximum capacity of the hard disk. When the location data expires or exceeds the hard disk capacity, the system overwrites the earliest data.
	Location Platform	The location platform is used to manage devices and subscribers, provide dispatch services, provide aid during emergencies, and monitor the operating status of the system. The location platform provides GUIs for operators. The location platform has the following characteristics <ul style="list-style-type: none"> • Supports visualized dispatch services such as track display, dispatch in a selected area, and emergency location. • Supports automatic registration of devices, remote dynamic management, and easy maintenance. • Supports online updating of devices. • Supports e-maps such as SuperMap.
Terminals		
450M Terminal	HC2102	HC2102 is an ultra low cost 450MHz phone with external antenna and elegant ID for common class customers. 1.77" LCD FM Flash light
	HC3011	HC3011 is a low cost multimedia phone with qwerty keypad.CDMA 450MHZ 2.3" QVGA LCD 2M camera Bluetooth MP3,MP4 FM
	FT8090	FT8090 Voice + Data +Fax* +WLAN High-quality voice service Packet data services max rate 1.8 Mbit/s in uplink and 3.1 Mbit/s in downlink IEEE802.11 b/g WLAN PC fax service G3 analog fax service Multiple supplementary service Public call office (PCO) * G3 analog fax service is optional
	FT8092	It is the updated version of FT8090, it can support DORB. Packet data services max rate 5.4 Mbit/s in uplink and 9.3 Mbit/s in downlink

Product Type	Model	Key Features
PTT Handset	C830e	<p>The HUAWEI C830E mobile phone (hereinafter referred to as the HUAWEI C830E) is a middle-to-high-tier phone developed by Huawei. It supports both the code division multiple access (CDMA) and the evolution-data optimized (EVDO) standards.</p> <p>The HUAWEI C830E provides abundant functions and powerful media processing capabilities, including:</p> <ul style="list-style-type: none"> • Professional PTT function • MMS, email, and website browsing • Streaming, data modem and GPS • MP3/MP4 playing, audio/video recording, and Bluetooth • Expandable memory through Micro-SD card • 3M AF camera • Support IP54 Protection Standard <p>The HUAWEI C830E enables you to enjoy wireless services anytime, anywhere.</p> <ul style="list-style-type: none"> • In the CDMA network or the EVDO network, you can use the HUAWEI C830E to make/receive calls, send/receive SMS/MMS, browse the Internet send/receive emails and schedule personal information. • You can use the HUAWEI C830E to enjoy additional services, such as media streaming, online MTV, and film trailers. <p>It works in frequency 450M</p>
	C830T	C830T is almost the same with C810e, but it works in frequency 800M
	C830e-ex	<p>The HUAWEI C830e-ex mobile phone supports both the code division multiple access (CDMA) and the evolution-data optimized (EVDO) standards.</p> <p>The HUAWEI C830e-ex provides abundant functions, including:</p> <ul style="list-style-type: none"> • Intrinsically safe protection • Professional PTT function • E2E encryption (Optional) • DMO (Optional) • Support IP54 Protection Standard • SMS, MMS • Data modem • GPS (Optional) • MP3/MP4 playing, audio/video recording
		<ul style="list-style-type: none"> • Expandable memory through Micro-SD card <p>The HUAWEI C830e-ex enables you to enjoy wireless services anytime, anywhere.</p> <ul style="list-style-type: none"> • In the CDMA network or the EVDO network, you can use the HUAWEI C830e-ex to make/receive calls, send/receive SMS/MMS • You can use the HUAWEI C830e-ex to enjoy additional services <p>It works in frequency 450M</p>
	C830T-ex	C830T-ex is almost the same with C830e-ex, but it works in frequency 800M
	HC9000e	<p>The HUAWEI HC9000e mobile phone supports both the code division multiple access (CDMA) and the evolution-data optimized (EVDO) standards.</p> <p>The HUAWEI HC9000e provides abundant functions, including:</p> <ul style="list-style-type: none"> • Professional PTT function • E2E encryption • DMO (Optional) • Support IP54 Protection Standard • SMS, MMS • Data modem • GPS (Optional) • MP3/MP4 playing, audio/video recording • Expandable memory through Micro-SD card <p>The HUAWEI HC9000e enables you to enjoy wireless services anytime, anywhere.</p> <ul style="list-style-type: none"> • In the CDMA network or the EVDO network, you can use the HUAWEI HC9000e to make/receive calls, send/receive SMS/MMS <p>It works in frequency 450M</p>
	HC9000T	HC9000T is almost the same with HC9000e, but it works in frequency 800M
Vehicle Mobile Station	C100	<p>The HUAWEI eAccess C100 Vehicle Mobile Station (referred to as the eAccess C100) is a standard 1-DIN sized CDMA TruStar mobile station developed by Huawei. It supports Huawei CDMA TruStar trunking service and the CDMA 2000 1x EVDO Rev.A services.</p> <p>The HUAWEI eAccess C100 provides abundant functions and powerful media processing capabilities, including:</p> <ul style="list-style-type: none"> • PTT • DMO point-to-point mode and trunk mode • E2E encryption • MMS, email, and website browsing • Data modem • GPS • Audio recording • Expandable memory through Micro-SD card

Product Type	Model	Key Features
		<ul style="list-style-type: none"> In the CDMA network or the EVDO network, you can use the HUAWEI eAccess C100 to make/receive calls, send/receive SMS/MMS, browse the Internet send/receive emails and schedule personal information.
Data card	EC900	450M DORA Datacard CDMA450MHz A/C band 1x/EV-DO Rel.0/EV-DO Rev.A/SMS Wireless receiving sensitivity: -100 dBm Maximum transmit power: 23 dBm Weight: about 50g Size: 86mm*46.5mm*10.5mm
	EC9001	450M&2.1G Dual-Mode USB Datacard Support CDMA2000 1x EV-DO Rev. A / Rev. B Support UMTS 2100MHz frequency band Support SMS and Voice (Optional) services Support receive diversity

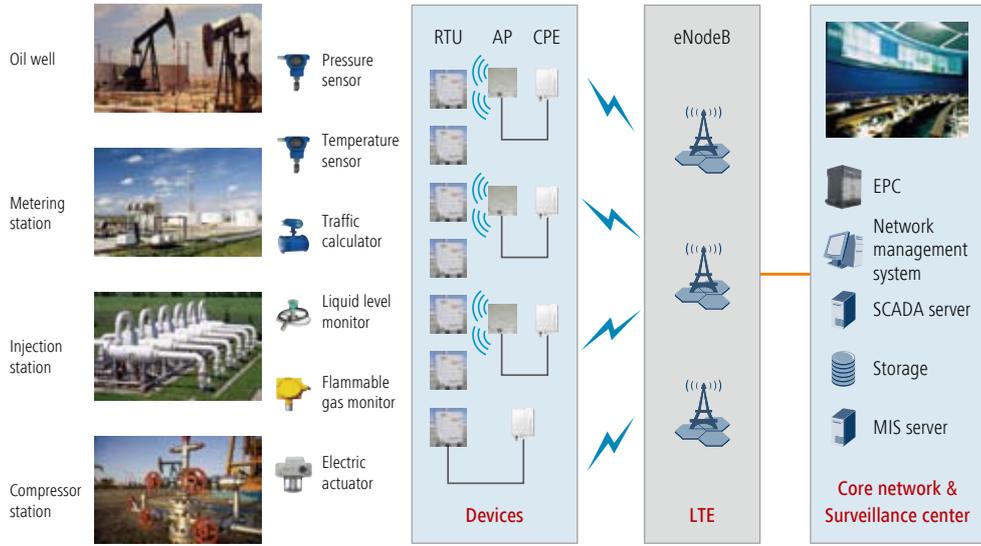
15 Private Wireless Network LTE Solution



Huawei Private Wireless Network LTE Solution provides a network with higher bandwidth and broader coverage of oil and gas fields in complex environments and areas where pipelines span. Data collection equipment and video surveillance equipment can be easily deployed at any location as needed to construct a brand-new backhaul system to transmit production data and surveillance images. In addition, the solution incorporates an LTE-based push to talk (PTT) cluster system which supports high-quality voice intercom and high-speed transmission of data and videos.

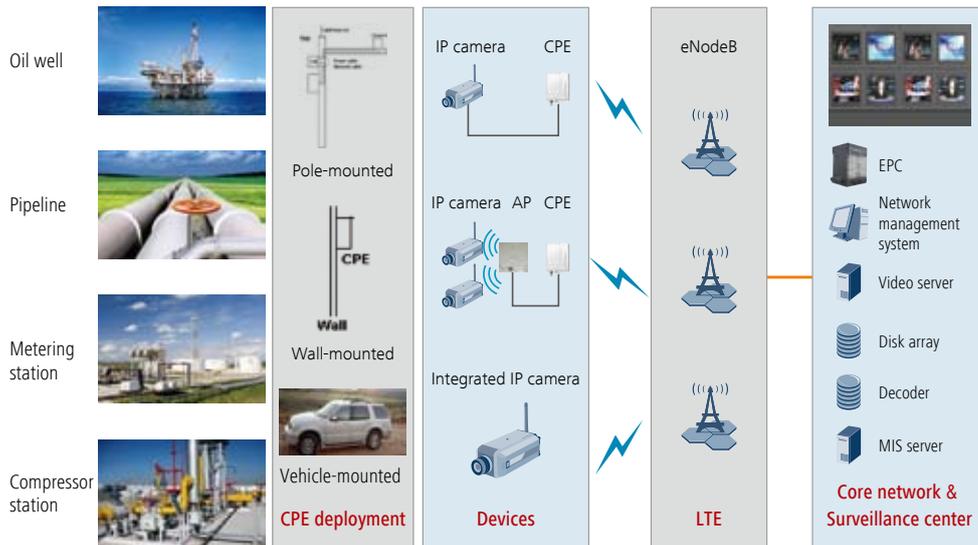
15.1 Network Diagram

SCADA:



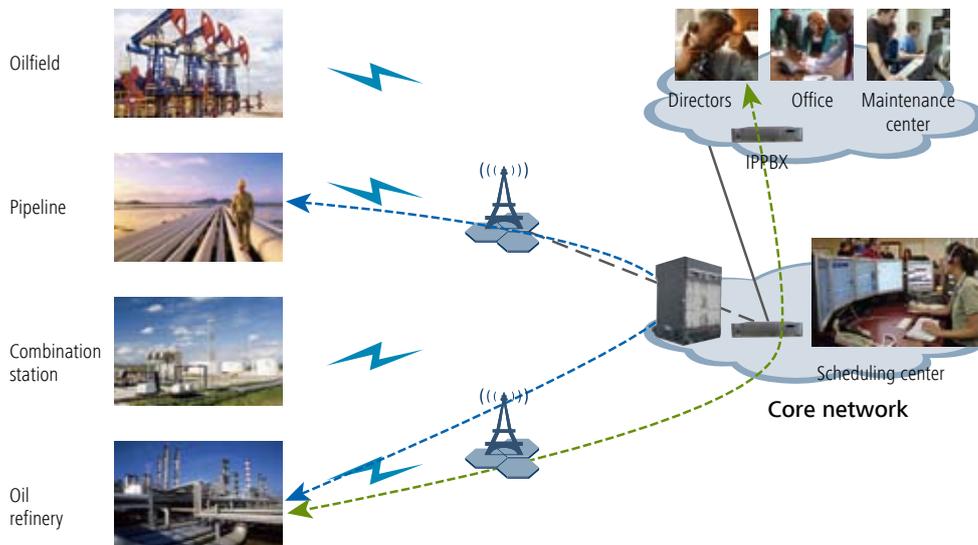
Data on production at oil wells and other sites is collected in real time by such equipment as sensors and traffic calculators, and then transmitted to remote test units (RTUs). RTUs are connected with the wireless network through LTE base stations by using APs or customer premises equipment (CPE). The production data is transmitted to the core network and control center via RTUs. All data collection equipment, RTUs, APs, and CPE are blast-resistance, waterproof, dust-proof, and applicable to different oil and gas production scenarios. This secure and reliable equipment ensures that production data is collected and transmitted in time to provide a timely basis for making informed decisions on production activities.

Wireless video surveillance:



Surveillance images are transmitted to the surveillance center via the wireless network. Surveillance devices can be deployed in the important areas of oil and gas fields and alongside pipelines. Surveillance cameras and CPE can be installed on telegraph poles, walls, or vehicles, and connected with the wireless network via network cables. If an oilfield covers an excessively large area where a lot of surveillance sites are needed, wireless cameras can be deployed and connected to the wireless network through wireless access equipment like AP and CPE. We also provide integrated IP cameras that can be immediately connected with the wireless network. CPE can be maintained by staff at the surveillance center in a remote manner, thereby improving maintenance efficiency.

Command and dispatching:



An LTE-based cluster communications system is interconnected with a telephone system. By leveraging the LTE technology that features high bandwidth, the cluster communications system supports not only voice communications, but also data and video services. It enables real-time and remote sharing of images, videos, and technical documents during collaborative work on production in oilfields, equipment maintenance, pipeline inspection, and scheduling activities. It also supports mobile PTT services so that the appropriate personnel can obtain detailed information to improve the efficiency of collaboration.

15.2 Highlights

- Broadband
 - Remote Supervisory Control And Data Acquisition
 - Video Surveillance
 - Multimedia PTT
 - Service Cooperation
 - Ultra Long-Range Coverage
- Secure & Reliable
 - High Reliability in Harsh Environments
 - Redundancy for Reliability
 - QoS Guarantee Core Business Quality
- Economical
 - Distributed eNode B
 - Compact CN
 - PC-Server OSS
 - Platform based device

15.3 Products

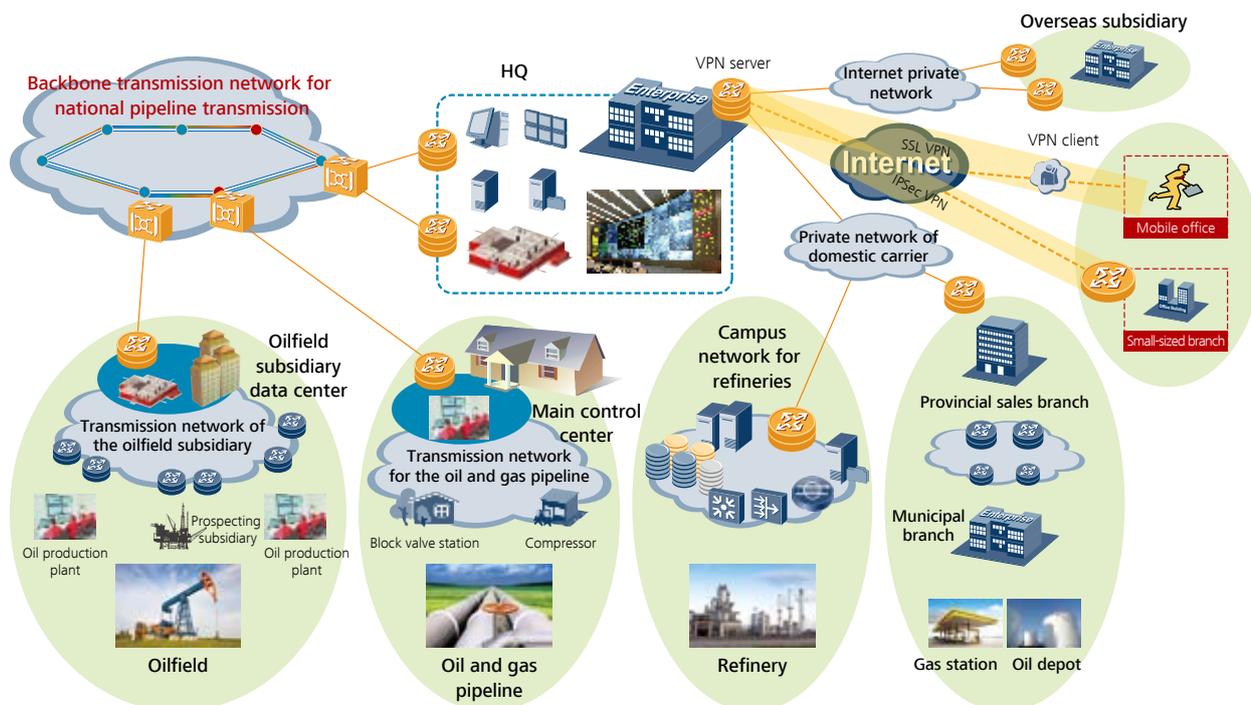
Product Type	Model	Key Features
NMS	iManagement M2000	The iManager M2000 centrally manages Huawei mobile network elements (NEs), including LTE/EPC NEs. The M2000 provides basic functions such as configuration management, performance management, fault management, security management, log management, topology management, software management, and system management. It also provides various optional functions.
Core Network	USN9810	The USN9810 can provide the functionalities of the mobility management entity (MME) and provide integrated user authentication management, which is part of System Architecture Evolution-home subscriber server (SAE-HSS)'s functionalities.
	UGW9811	The UGW9811 combines the functions of a serving gateway (S-GW) and a PDN gateway (P-GW), is intended for use on the evolved packet core (EPC) system.
	eCNS600	The Enterprise Core Network System 600 (eCNS600) is developed by Huawei for the enterprise Evolved Packet Core (EPC), and it applies only to the Long Term Evolution (LTE)/System Architecture Evolution (SAE) architecture. It integrates the subscriber management functions of the SAE-HSS, the Mobility Management Entity (MME) functions, and the Serving Gateway (S-GW)/PDN Gateway (P-GW) and Policy and Charging Rules Function (PCRF) functions. The eCNS600 is operated and maintained in a centralized manner.
Base Station	DBS3900	The eNodeB is used for radio access in the LTE system. The eNodeB mainly performs radio resource management (RRM) functions such as air interface management, access control, mobility control, and user equipment (UE) resource allocation. Multiple eNodeBs constitute an E-UTRAN system.
Terminal	Handset eH811	HUAWEI eH811 (eH811 for short) is a Huawei developed mid-range to high-end smart phone for industry customers. Based on powerful hardware configuration and Android 4.0 System (Ice Cream Sandwich), this terminal has excellent performance.
	CPE eA660/eA661	The HUAWEI eA600/eA661 serial wireless gateway is a LTE & Wimax customer premises equipment (CPE). The eA660/eA661 are outdoor units (ODU) which can be deployed independently outdoor or on vehicle for data collection, video surveillance etc.
	CPE eA100	eA100 is an indoor unit (IDU), which can be deployed indoors. Cooperating with eA660, eA100 can support wireless broadband access, VoIP, and other Internet services.
	MiniPCIe card ML801	The ML801 module is one of LTE (Long Term Evolution) standard Mini PCIe (Peripheral Component Interconnect Express) data module, it is can be integrated into the terminal as LTE Modem to provide wireless data interface, data transmission, etc..

16 WAN Interconnection Solution



Huawei has proposed a wide area network (WAN) interconnection solution for oil and gas companies. The companies can build IP network, optical transport network (OTN), wavelength division multiplexing (WDM), or multi-service transmission platform (MSTP) network, and deploy NE40 routers at the entry points of branches' networks, thereby realizing backbone network transmission among the branches. The transmission could also be accomplished by leasing network resources from the network operator without building an entire network. The deployment of multiprotocol label switching (MPLS) and layer 3 virtual private networks (L3VPNs) in overseas branches provides secured connections between the headquarters and branches. For employees typically based out of their corporate office, they can have access to the corporate network for corporate data via three technologies: the secure sockets layer (SSL) virtual private network (VPN), IP security (IPSec) VPN, and layer 2 tunneling protocol (L2TP) VPN. These three technologies not only provide information security for the oil and gas company, but also are characterized by low cost, flexibility, and convenience.

16.1 Network Diagram



16.2 Highlights

- End-to-end solution
 - The end-to-end IP + optical solution and products are used.
 - A unified end-to-end NMS platform is adopted.
 - Data and transmission services are deployed in an end-to-end manner.
- High transmission reliability
 - Device-level and network-level protection are provided.
 - The ASON network is implemented.

- The protection switching time of IP services is 50 ms.
- Differentiated and hierarchical protection is provided for services
- Ultra-long-distance transmission
 - A ultra-long-distance transmission solution supports the 270–380 km transmission without repeaters.
 - Fewer repeaters are used to reduce O&M costs
- Simplicity and ease of O&M
 - The service quality can be managed in an end-to-end and visualized manner.
 - IP services are managed in the way how SDH services are managed, simplifying O&M.
 - Alarms are analyzed intelligently and network faults can be located in one-click mode.
- High flexibility and scalability
 - The live network evolves into the OTN & ASON gradually.
 - IP routers can be upgraded to 400G platforms smoothly.
 - New services can be deployed without affecting the live network.
- Large bandwidth
 - MSTP devices support intermediate- and small-granularity services with the rate ranging from 155 Mbit/s to 10 Gbit/s.
 - OTNs support smooth evolution from 80 λ x 10 Gbit/s into 80 λ x 40 Gbit/s and into 80 λ x 100 Gbit/s, solving the problem of insufficient bandwidth thoroughly.
 - Routers use cutting-edge 200G boards.

16.3 Products

Product Type	Model	Key Features
DWDM/OTN Transmission	OSN8800 Series	The large-capacity long-distance optical transmission system; savings from congenital fiber solutions for the evolution of low-cost bandwidth solutions thus derivative is ubiquitous in the enterprise trunk solutions, integrated 40G/100G, large-capacity OTN photoelectric
	OSN6800 Series	
	OSN 3500	The leading MSTP optical transmission systems with the advanced character as ASON, 380km super long, hybrid mode, internal WDM and 1588v2.
	OSN 7500	
Core & Aggregation Router	NE40E-X16	The most powerful core & aggregation routers with 400G platform, to fulfill the coming 10 years requirements.
	NE40E-X8	
Access Router	NE40E-X3	High capacity access routers with 100G platform
	NE20E-X6	The mature access router with high reliability and high performance.
Security Gateway	Eudemon 200E-X	Integration of routers, switches, WiFi, voice and FW, with advanced firewall functions and UIM expanding capacity. The future security products with IPv6 ready.
	Eudemon 1000E-X	
	SVN3000	
NMS	iManager U2000	NMS for WAN, with unified management platform for Transport, IP, access, and third-party IP devices.
	eSight	The campus network NMS with IP/IT unified management platform

17 Comprehensive Campus Network Solution



Oil and gas companies' businesses, like prospecting, production, transport, processing, storage, and sales, are supported by different campus networks. Along with the development of information technologies, campus networks have developed from the one-machine era to the data era and now to the multimedia, cloud, and mobile era. In the one-machine era, we shared documents through computer connections within LANs. In the data era, information was characteristically shared through remote or regional data transmission, which is exemplified by enterprise OA systems. Now, in the multimedia, cloud and mobile era, we share large volumes of

data around the globe in real time, which makes high-quality user experience possible.

Most oil and gas companies are facing the following challenges with their campus networks:

Campus networks cannot guarantee business continuity. Campus network breakdown interrupts business operations and takes several seconds (too long in this case) to recover. Unable to accurately locate and promptly respond to network faults, existing campus networks cannot meet the real-time requirements of multimedia applications.

The existing network platform cannot satisfy the requirements for bandwidth and high-quality services. Video services require increasingly high bit rates, from 1 Mbit/s for ordinary videos, to 4 Mbit/s for standard-definition videos, to 10 Mbit/s for high-definition videos, and even to 50 Mbit/s for high-definition DVD playing. Requirements for quality of service (QoS) are more demanding (latency < 150 ms, jitter < 50 ms), because telepresence video conversations and desktop cloud will become the trends that replace the currently popular IP telephones.

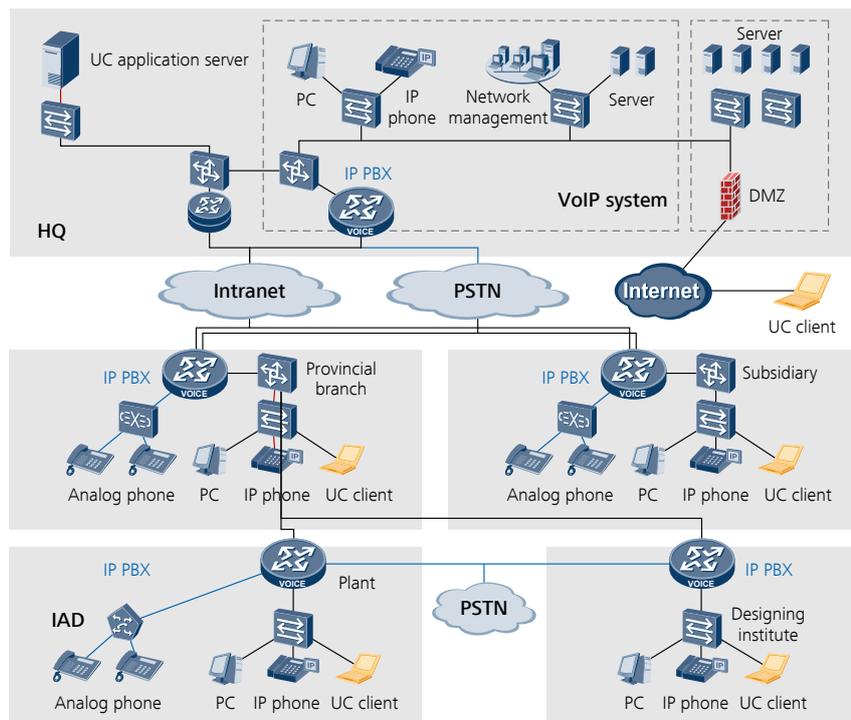
New services and new access devices may cause security hazards. Finding ways to implement fine-grained management to deal with the diversified applications used in internal networks and ensuring security compliance during use of internal terminals in addition to implementing specific security measures between different services is the critical task to securing networks.

Access from different devices complicates control measures, making the ability to realize converged and unified access to services a top priority. Operating multiple devices, like IT-based devices, IP devices, security devices, and broadcasting devices, many of the currently deployed device management platforms cannot efficiently handle O&M tasks and fail to monitor services.

With the Huawei Comprehensive Campus Network Solution, oil and gas companies will be empowered to deal with these challenges because the solution integrates specific solutions in the terminal, network, platform, and application layers, enabling enterprises to build a converged, efficient, secure, and integrated campus network.

17.1 Network Diagram

Scenario 1: Voice and UC network architecture for the campus network



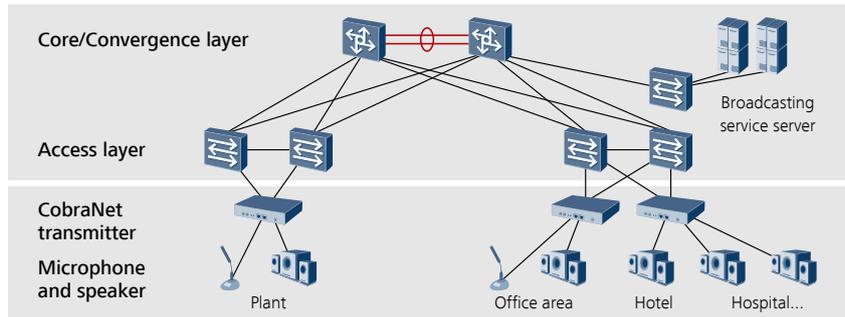
HQ: This solution deploys large-capacity IP private branch exchanges (PBXs), UC systems, and conference servers for HQ user access, UC services, and conference services. This solution also supports communication with local carriers through E1 ports and session initiation protocol (SIP) trunks and provides call routing for the IP PBXs at regional centers and their subordinate organizations.

Regional data centers: This solution deploys IP PBX to provide VoIP services for regional data center users and supports communication with local carriers through E1 ports and SIP trunks. The IP PBX at regional data centers support tier-2 call routing

for voice communication between representative offices in the region.

Overseas branch offices: This solution deploys IP PBX to support voice access at overseas branch offices and localizes public switched telephone networks (PSTNs) through foreign exchange offices (FXOs) with E1 ports.

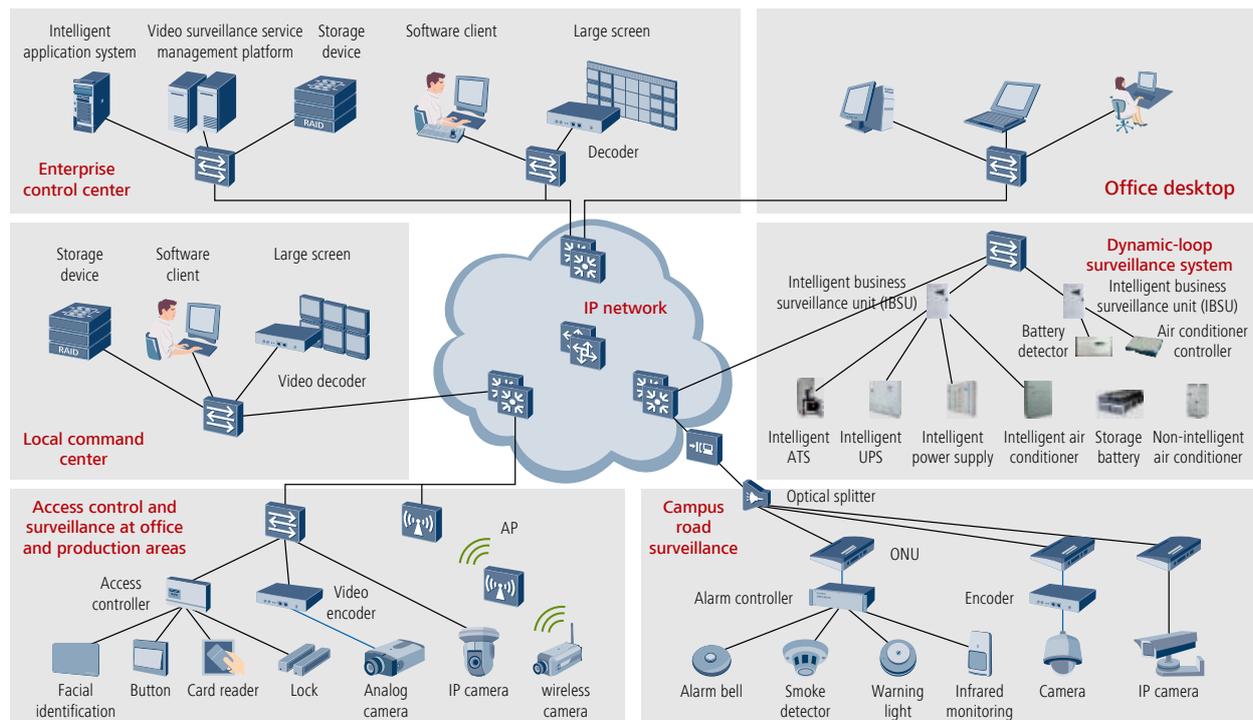
Scenario 2: Digital broadcasting



Broadcasting systems are widely used in production plants, residence areas (including hospitals, schools, and gyms), conference centers, canteens, training centers, plant hotels, and other premises.

CobraNet and other technologies realize Ethernet-based audio broadcasting with streamlined deployment, improved reliability, and separated data and audio loading. Compared with traditional audio analog transmission, audio broadcasting has more advantages. It is recommended that broadcasting networks adopt independent networking, physical isolation, a hierarchical architecture, and redundant links. Also, loops must be avoided in the network.

Scenario 3: Campus security surveillance system

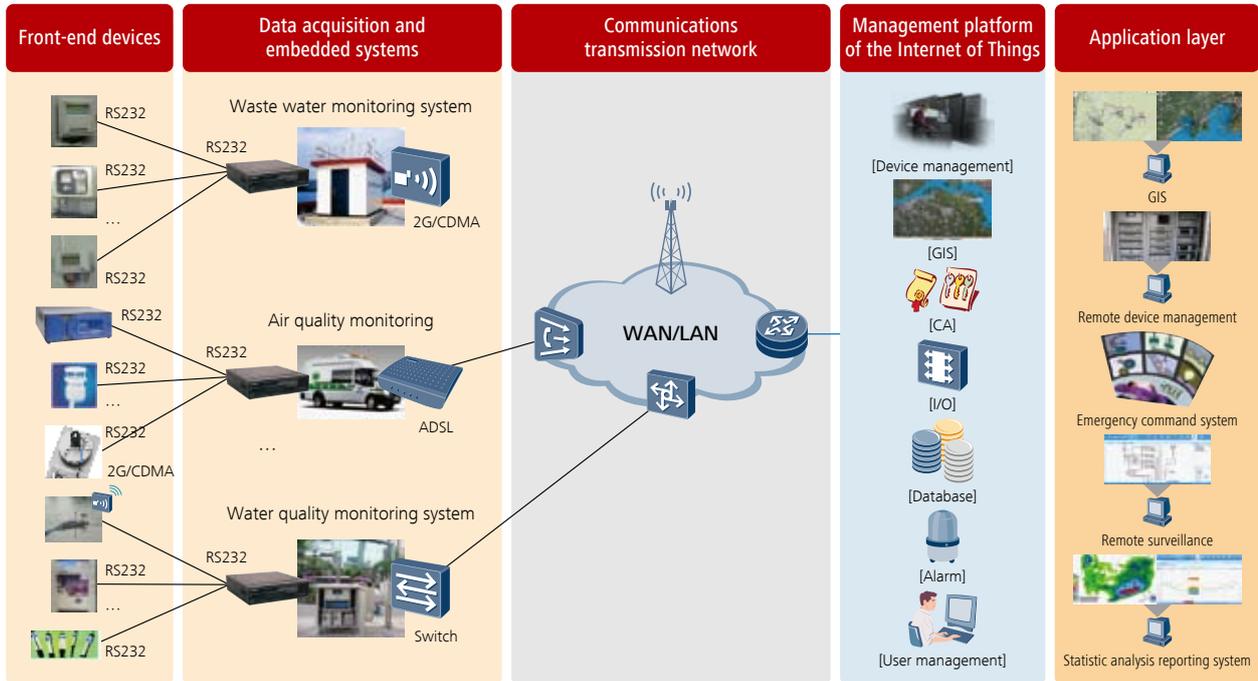


Integrating the capabilities of multiple surveillance systems, the digital security solution provides security systems for production and living environment surveillance in campuses, detects dangers as soon as they occur, effectively prevents dangers from spreading or getting out of control, and allows personnel to quickly respond to threats or emergencies.

- The Huawei campus security surveillance platform can manage surveillance systems with dozens to thousands of devices. Being able to support analog front end, IP front end, and analog digital mixture architectures, this solution can meet enterprises' deployment requirements in different application scenarios, thereby minimizing the investments made in these systems.

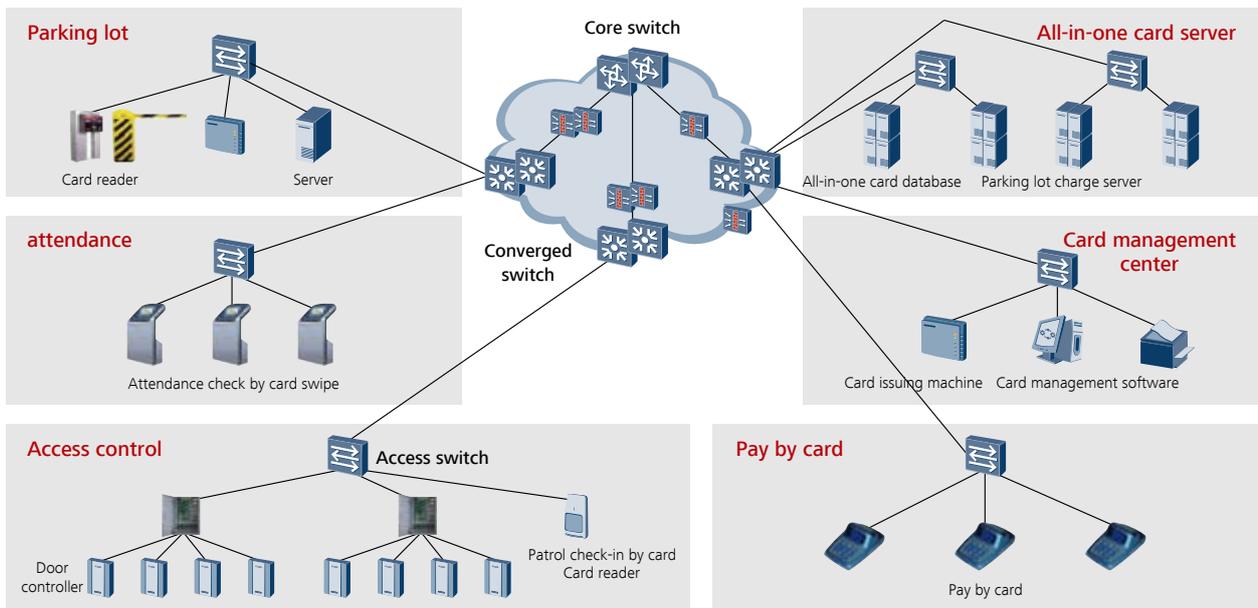
- The Huawei campus security surveillance platform supports an integrated video platform and high-definition applications. The platform can realize large-scale access of analog and online video images and support large-capacity standard-definition and high-definition video image encoding and matrix switching, satisfying enterprises' needs for high-definition video surveillance.

Scenario 4: Environmental monitoring



Environmental monitoring systems are one of the infrastructures that support campus operations of oil and gas companies, monitoring waste water, waste gas, and solid wastes in production and office areas. This system consists of front-end devices, data acquisition and embedded systems, communications transmission networks, management platforms for the Internet of Things, and the application layer. Front-end devices send the data about the waste water, waste gas, and dust to data acquisition and embedded systems which then transfer the data through communications transmission networks to the management platform of the Internet of Things for processing and storage. The upper-layer application system displays environmental data and implements environmental surveillance.

Scenario 5: All-in-one card system solution



As an important element in the campus network operations, the all-in-one card system requires a data backup system to ensure data security. Security card service (access control, parking lot, consumption, patrol, attendance) systems constitute an independent sub-network which is connected to the switch, supporting access of card service terminals and their convergence at the device layer. Card issuance data, consumption records, and attendance records are all stored in the background database system (server) located in the equipment room. The entire card service sub-network is safeguarded by firewalls to ensure security, isolation, and mutual access control.

17.2 Highlights

- **Converged:** This solution supports multiple services (such as office automation, broadcasting, communications, and surveillance) running on a common network platform, delivering smart business utilities.
- **Efficient:** Supporting automatic environmental surveillance, multi-dimensional communication, and interconnection between communications, surveillance, and other services, this solution helps improve production efficiency.
- **Secure:** This solution includes a multi-dimensional automatic security system as well as end-to-end network security, vertical virtualization, service isolation, internal security, and the network reliability utilities that help guarantee continuity of operations and uninterrupted services.

17.3 Products

Product Type	Model	Key Features
Access Switch	S5700 Series	Campus network convergence for the oil&gas network access; Fast to the desktop, and a variety of scenarios developed by the cassette switch series.
	S3700 Series	
	S2700 Series	
Aggregation Switch	S6700 Series	10G aggregation box; The highest 10G port density(up to 48 ports), supporting 96Gbps wirespeed forwarding. It supports stack function(up to 9 boxes stack), to expand capacity and ports.
	S7700 Series	High performance aggregation swithes with up to 2Tbps switching capacity,supporting cluster to expand ports and capacity.
Core & DC Switch	S9700 Series	High performance core/DC switch with up to 40*10G card, the highest 10G desity in industry.
	CE6800(2012Q4)	DC TOR switch, with up to 48*10GE Base-T and 4*40GE QSFP+, to meet future 10years fast rising non-block switching.
	CE12800(2012Q4)	The DC switch, using the engine with industry-leading performance, with 48 Terabit switching capacity, 3 times the industry average and 8*100GE, 24*40GE/96*10GE line-speed boards.
Voice & Security Router	AR3260	Campus access routers series,with switching, 3G, voice, security and other functions in a wide range of applications fully meet the business expansion demand.
	AR2240/AR2220	
	AR1220 Series	
	AR200 Series	
Security Gateway	Eudemon 200E-X	Integration of routers, swithes, wifi, voice and FW, with advaced firewall fuctions and UIM expanding capacity. The future security products with IPv6 ready.
	Eudemon 1000E-X	
	SVN3000	
WLAN AP	AP5010SN-GN	Basic indoor single brand AP
	AP5010DN-AGN	Basic indoor dual brand AP
	AP6510DN-AGN	Outdoor dual-brand AP, RJ45, and POE power supply
	AP6610DN-AGN	Outdoor dual-brand AP, SFP, and AC power supply
	AP6010SN-GN	Enhanced indoor single-brand AP
	AP6010DN-AGN	Enhanced indoor dual-brand AP
	AP7110DN-AGN	Indoor 3x3 MIMO single-brand AP, with 450Mbps capacity
WLAN AC	ACU card in S9300/S7700	The service unit integrated in S9700 or S7700, as an AC proviing wireless service on large or medium-scale oil&gas fld networks.
	AC6605-26-PWR	The high-end access controller developed by Huawei integrates 1000M Ethernet switch functions to implement wired and wireless access.
Edge Router	NE40E-X3/X8	The most powerful 400G platform routers, to fullful the coming 10 years requirements.
	NE20E-X6	The mature access router with high reliability and high performance.
NMS	eSight	The campus network NMS with IP/IT unified management platform

18 Security Surveillance Solution

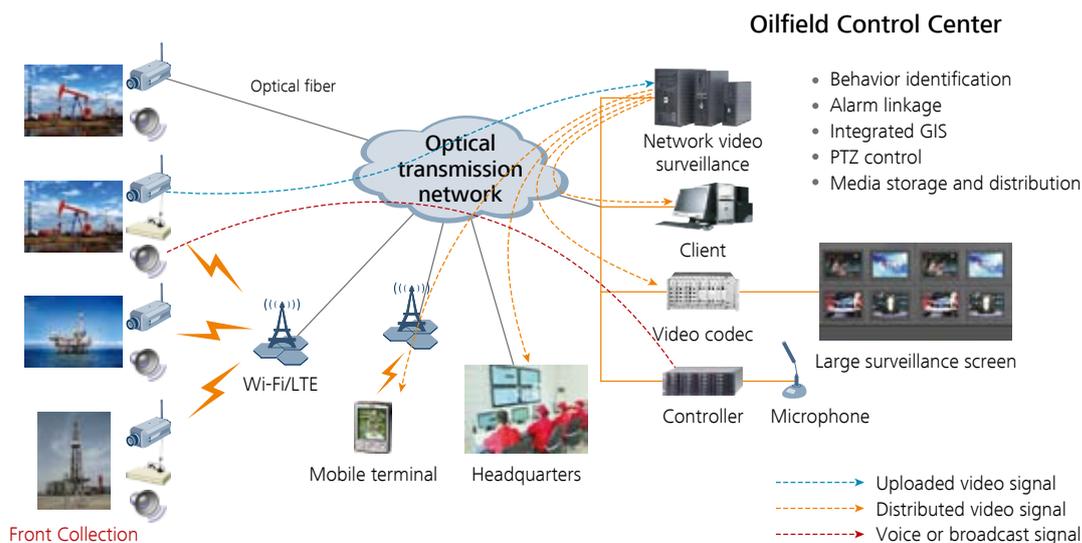


As one of the most important energies in modern times, the petroleum energy features easy flammability and explosion, which brings potential risks on the supply chain. Meanwhile, the equipment of petroleum enterprises are confronted with various man-made and natural damage. Huawei eSpace Security Surveillance Solution provide a complete solution to protect the safety of oilfield production, pipeline transmission and campus.

18.1 Oilfield Surveillance Solution

The video surveillance system can surveillance the production site remotely, analysis the anomaly scene, image and realize behavior identification, and alarm linkage when there is anomalies .The control center can communicate with production sites, handle alarms, and commands production flows. The headquarters uses the video surveillance system to monitors the production devices in oil fields and make decisions.

Network Diagram



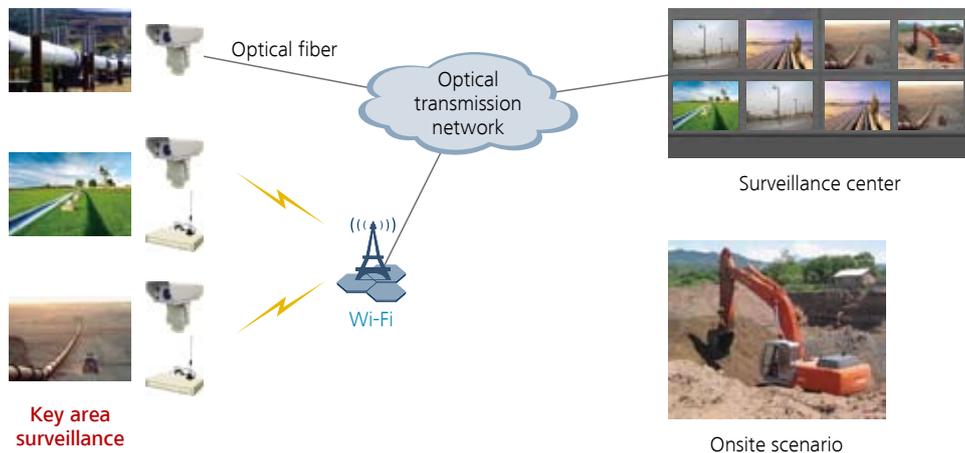
Highlights

- Remote surveillance of production site
- Multi-platform access, unified management
- High bandwidth support video and image transmission
- Intelligent storage, improve query efficiency

18.2 Pipeline Security Protection Solution

The pipeline security protection system uses main optical cables deployed along pipelines to support fiber intrusion detection and video linkage surveillance of pipelines.

Network Diagram



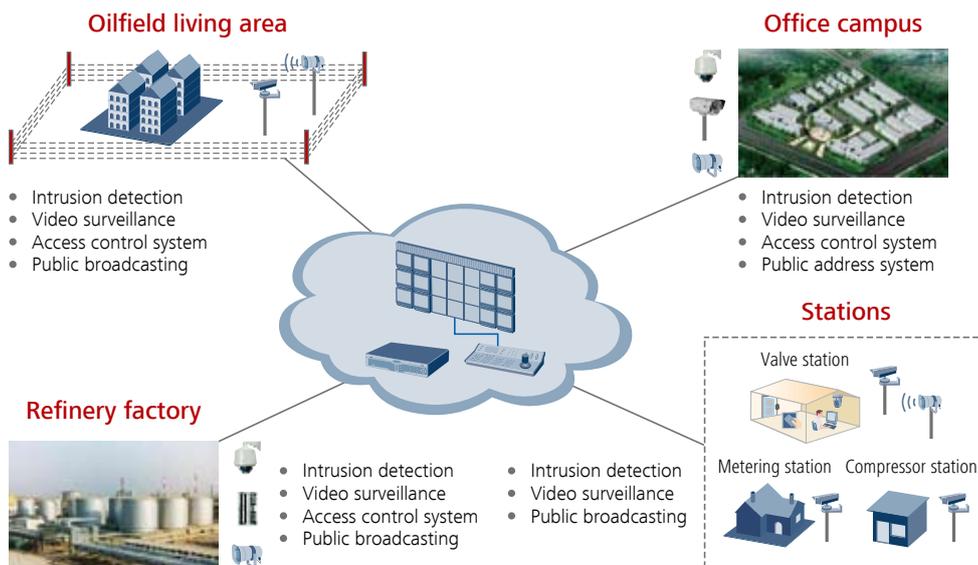
Highlights

- Long-distance and end-to-end detection
- Accurately location by linkage of FIDS and IVS
- Green solar power supply

18.3 Campus Security Protection Solution

The Huawei Campus Security Protection Solution integrates various surveillance systems, ensures production and living security in the whole campus.

Network Diagram



Highlights

- The system provides real-time video surveillance and alarm reporting, and displays the information in videos to facilitate the quick emergency positioning.
- Huawei integrates and connects multiple systems such as the intelligent video surveillance, fire, access control, perimeter guarding, electronic patrol, alarm linkage, and GIS to develop a comprehensive campus security protection system.
- The control center performs quick emergency positioning, unified dispatching and coordination, and quick emergency response (with the support of the public security and fire departments).

18.4 Products

Product Type	Model	Key Features
Enterprise Networking		
Switch	Sx700 Series	Campus network convergence for the enterprise network users, access, IDC access and Gigabit, Fast to the desktop, and a variety of scenarios developed by the cassette switch series
Router	AR12/22/32 Series	Set of routing, switching, 3G, voice, security and other functions in a wide range of applications fully meet the business expansion demand
	AR200	
Enterprise UC&C		
HD cameras	eSpace IPC2601-P/5601-P	Box network camera
	VS-IPCD143C-P/13C-P	HD box network camera
	VS-IPCH13BM-P	Wide dynamic HD box network camera
	eSpace IPC2701-P/5701-P	Semi-dome indoor network camera
	VS-IPCH23C-PoE	Waterproof violation-proof HD semi-dome network camera
	VS-IPCD33C3 VS-IPCH33C3	Outdoor HD intelligent dome network camera
SD Cameras	VS-IPC-D11P-P VS-IPC-D12P-P	Box network camera
	VS-IPC-D11P-IR1 VS-IPC-D12P-IR1	Infrared waterproof box network camera
	VS-IPC-H12B-PoE	Wide dynamic box network camera
	VS-IPC-D22P-IR1	Indoor infrared semi-dome network camera
	VS-IPC-D22P	Indoor violation-proof semi-dome network camera
	VS-IPC-H22BP	Indoor wide dynamic violation-proof semi-dome network camera
	VS-IPC-D323/329/325/328	6-inch high-speed intelligent dome network camera
	VS-IPC-H32BP9 VS-IPC-H315-IR8	Outdoor high-speed intelligent dome network camera
Analog Cameras	VS-CA-D12P VS-CA-H12P	Box analog camera
	VS-CA-D12P-IR1	Infrared box analog camera
	VS-CA-D12BP VS-CA-H12BP	Wide dynamic box analog camera
	VS-CA-D22P/D21P	Indoor semi-dome analog camera
	VS-CA-H22P-IR3	Indoor infrared waterproof semi-dome analog camera
	VS-CA-H22P	Indoor violation-proof semi-dome analog camera
	VS-CA-D323/329/325/314	Outdoor intelligent dome analog camera
	VS-CA-H315-IR8	Outdoor infrared high-speed intelligent dome analog camera
DVS&DVR	VS-EC-D24R/D28R/D29R	Video recorder
	VS-EC-D19R	Video recorder
	VS-EC-D24M	Vehicle-mounted video recorder
	VS-EC-D21S/D14S	Video server
	VS-EC-H24R/H28R/H29R	Video recorder
Decoder and Decoding Card	VS-EC-H21S	Video server
	VS-DC-D38F	Soft-decoding server
	VS-DC-D24	Decoder
	VS-DC-D24F/D21H	HD decoder
	VS-DC-H21F	HD decoder
	VS-DC-H24H/H28H	Decoder
NVR	eSpace DEC6001	Decoder
	SmartNVR 100	NVR managing a maximum of 16 cameras
	SmartNVR 3000	NVR managing a maximum of 128 cameras
Enterprise IT		
Server	RH2285	Large-capacity storage, high-performance server products distributed storage, data mining, electronic photo album, video and storage business, and enterprise infrastructure applications
	E6000	A new generation of carrier-class blade server platform, integrated computing, switching, storage, IO and management functions
Enterprise Security		
Unified Threat Management	Eudemon200E Series	Security business needs for small and medium enterprises, the introduction of a new generation of unified security gateway, a firewall, routing, anti-DDOS, wireless (WiFi/3G), intrusion protection (IPS), anti-spam, anti-virus, URL filtering, Internet management VPN features in one

Product Type	Model	Key Features
	Eudemon1000E Series	For the large institutions, parks and launch of data center unified security gateway
Data Center Firewall	Eudemon8000E Series	10 Gigabit IPS security gateway, its flexible I / O interface configuration, as well as extensive security operations to protect, to fully meet the user of the data center, ISP and other highly integrated network security, fast response, high-speed processing and long-term security needs.
SSL VPN	SVN300/2230/5530	The secure access gateway for remote access of corporate, government, carriers, mobile office, third-party access, multimedia tunnel access and other security access applications provide a safe overall solution

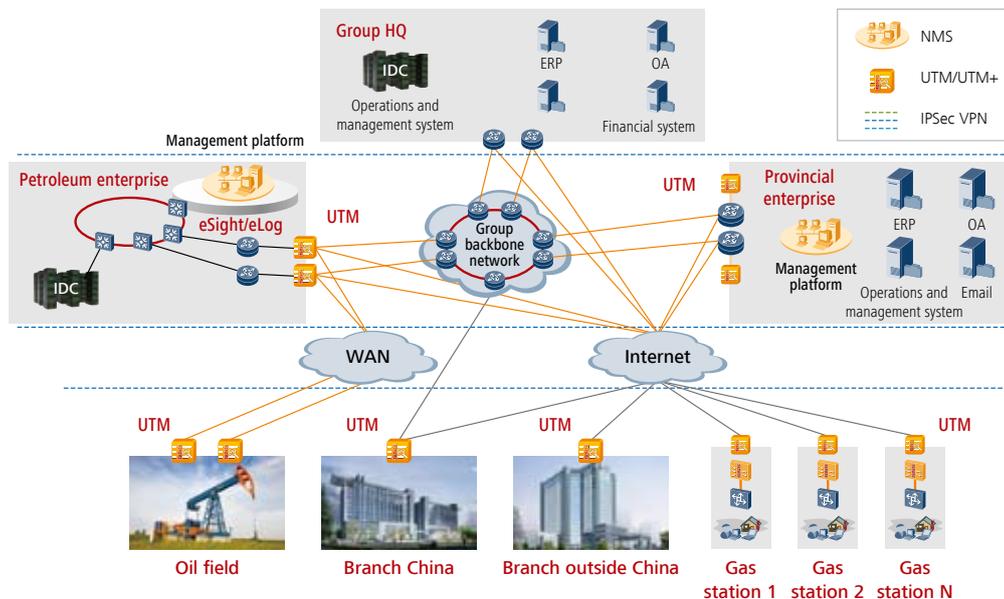
19 Enterprise group Network Security Solution



Till now, the multi-access technology had evolved from the first generation of narrow band technology, such as ATM, X.25, frame relay, DDN, and ISDN, to the second generation of SDH technology, such as E1, E3, and 155 Mbit/s, 622 Mbit/s, and 2.5 Gbit/s POS interfaces. Currently, the ADSL, VDSL, PON, FE, GE and 10 GE interfaces and the MPLS VPN technology are used. During this process, the TCO experiences a steady decrease. According to the statistics and analysis of professional agencies, the rapid growth of VPN leased line services raises an increasing requirement for multi-level access devices. Huawei multi-level access integrated security solution for the energy industry aims to achieve the following:

- Secure: provides an all-round full-dimensional UTM-based security solution.
- Intelligent: provides user group-based application identification, resource management, security policy management, and report display functions.
- Cost-effective: supports devices with both security and routing functions and maximizes the solution value by means of one-time network construction.

19.1 Network Diagram



19.2 Highlights

- Professional VPN vertical network. Security into network, Oneself security , all FW/IPS/AV/VPN in one.
- All-around anti-virus and anti-attack, High quality security, AV/IPS detection rate more than 99%, IPS work on leak of system.
- Careful application access control, more than smart, more than 1000 applications, base on user policy management.
- One building network, more value, reduce the cost. One station hand over, have all functions of security and route.
- Easily expand, easily manage, easily maintenance. All network inspection, visible interface, unity management platform.

19.3 Products

Huawei has set up a world-class security capability center and an excellent security solution development team. By integrating powerful carrier-class security hardware with multi-functional security software, Huawei provides a highly adaptable and user-friendly campus network security solution for enterprises in the energy industry. The primary security products are as follows:

Product	Class	Type	Description/Feature
Unified threat management (UTM)	Low-end UTM Applicable to SOHO, SMB, branches, and medium-sized enterprises	Eudemon200E-X1	1. Highest Interface Density: 14*10G, 64*GE 2. Best Unit Performance: up to 20G 3. Best Security Experience: 99% of effective virus detection rate Upgrade service globally at the same time One-click configuration Functions: 1. IPS/Antivirus/Anti-spam /URL filtering 2. L2TP VPN, SSL, VPN, IPSEC VPN, MPLS, VPN, GRE VPN 3. IPv6; 4. standard dual power supplies (AC/DC optional) 5. Professional anti-DDoS solution 6. Support Wireless, Voice and GSM/3G connection
		Eudemon200E-X1W	
		Eudemon200E-X1AW	
		Eudemon200E-X1AW-W	
		Eudemon200EX1AGW-C	
		Eudemon200E-X2W	
		Eudemon200E-X2	
		Eudemon200E-X3	
		Eudemon200E-X5	
		Eudemon200E-X6	
	Eudemon200E-X7		
	Mid-range and low-end UTM Applicable to large and medium-sized enterprises and small-sized IDCs	Eudemon1000E-X3	
		Eudemon1000E-X5	
		Eudemon1000E-X6	
Eudemon1000E-X7			
Eudemon1000E-X8			
High-end firewall	Applicable to large-sized enterprises, IDCs, and ISPs	Eudemon8000E-X3	Key features: 1. Unparalleled high-performance firewall product 160 Gbps throughput 64 million concurrent connections 4 million new connections per second 128 Gbps VPN 64 Gbps IPS 2. Unique firewall with dual main processing units (MPUs) 3. Flexible scalability
		Eudemon8000E-X8	
		Eudemon8000E-X16	
Anti-DDoS gateway	Applicable to non-carrier data centers and anti-DDoS of network applications, such as DNS, Web, online trade, online banking, and online games	AMS1000-I (Eudemon1000E-I)	High-performance: 200 Gbit/s defense, second-latency defense 100+ kinds of attacks defend, zero false positive, and defense solution based on such applications as web, e-banking, DNS services, and mails, etc. Fine-grained defense policy based on applications, extensive reports, multiple evidence collection technologies, which make security management intuitive, manageable, and traceable
		AMS1002	
		AMS1005	
	Anti-DDoS for data centers	AMS8003	
		AMS8008	
		AMS8016	

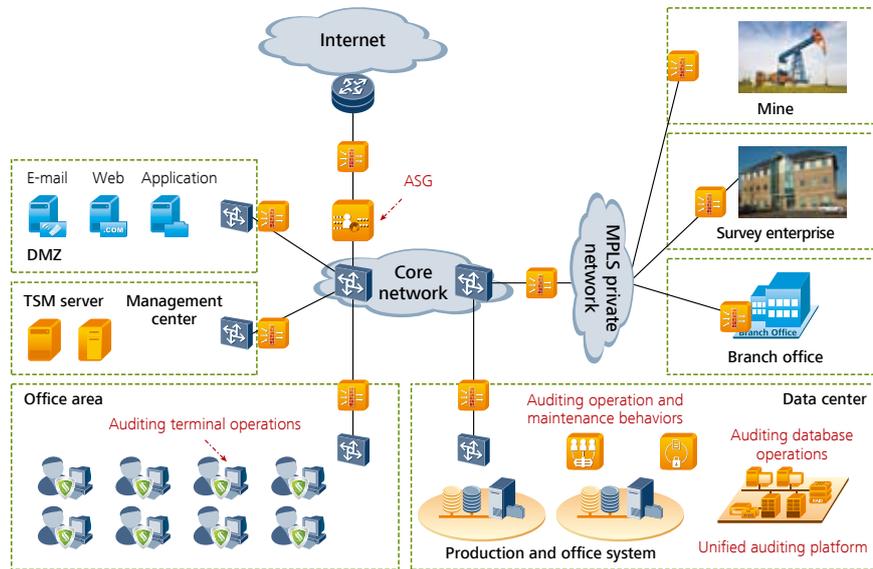
Product	Class	Type	Description/Feature
Intrusion Detection System	Low-end IDS Monitoring intranets and egress of extranets	NIP2200D	All-round detection mechanism All-round threat coverage Excellent detection performance Global attack discovery Vulnerability-based signature, low false positive rate, anti-evasive Traffic model self-learning function, preventing manual threshold configuration errors
		NIP2100D	
	Mid-range and low-end IDS Monitoring intranets and egress of extranets	NIP5200D	
		NIP5100D	
Intrusion Prevention System	Low-end IPS Protecting data centers, Internet egresses, and intranets	NIP2100	All-round detection mechanism All-round threat coverage Excellent detection performance Global attack discovery Vulnerability-based signature, low false positive rate, anti-evasive Traffic model self-learning function, preventing manual threshold configuration errors
		NIP2200	
	Low-end IPS Protecting data centers, Internet egresses, and intranets	NIP5100	
		NIP5200	
Security Web gateway (online behavior management)	Mid-range and low-end ASG Managing and auditing employees' online behaviors at the intranet egress	ASG2100	Identifies 1200 plus application protocols, Identifies more than 65 million URLs and 130 content categories. Provides more than 10 types of logs and tens of comprehensive analysis reports for technical engineers. Supports global reputation synchronization to obtain malicious website information rapidly and prevents fraudulent activities.
		ASG2200	
		ASG2600	
		ASG2800	
SVN	Mid-range and high-end SSL VPN gateway Remote access to large- and medium-sized enterprises: Traditional SSL VPN access Unified communications Mobile working solution	SVN5560	SSL/IPSEC integrated gateway End-to-End Security Protection Web access, File access, TCP applications such as Notes and Telnet and Other complex services
		SVN5530	
	Low-end SSL VPN gateway Applicable to the remote access of middle- and small-sized enterprise	SVN2260	
		SVN2230	
Security compliance management	TSM Terminal security management system	TSM	Support network access control, terminal security policy management, terminal asset management, outside device management and so on.
	DSM Document security management system	DSM	Support document encrypt and distribute by power of somebody. Protect the document to disclose a secret.
Versatile security management	VSM security gateway software	VSM	network devices management security devices management
	eLog log collection system	eLog	Overall Log Management Platform Overview of Device Information Auditing logs and behaviors, and generating host database reports Querying session events Setting a report generation period and dumping reports

20 Campus Network Security Solution



In the information security field, Huawei promotes three integrated information security solutions covering campus network security, vertical network security, and data center security for oil, gas, and mining enterprises in the energy industry. In addition, Huawei develops modular solutions to meet customer requirements, catches big security opportunities in the energy industry, and seeks small and medium security opportunities with the help of agents.

20.1 Network Diagram



20.2 Highlights

The campus network security solution for the energy industry is an integrated information security solution. The solution has the following features:

- Ensures information security in operation and office areas in terms of inter-network connection, production control, data communication, and office applications.
- Provides an end-to-end comprehensive solution for the access control, application security, network O&M, auditing, and management of campus networks in the energy industry.
- Meets the requirements of different enterprises in the energy industry by providing over 10 sub-solution modules.
- Adapts to enterprise campus networks because of features like excellent scalability and easy deployment/management, which helps to reduce construction or reconstruction costs.
- Provides security devices with carrier-class reliability to meet the high reliability requirement of the energy industry.

20.3 Products

(The same as "Enterprise group Network Security Solution", refer to "19.3 Products")

21 Cloud Computing Data Center Security Solution

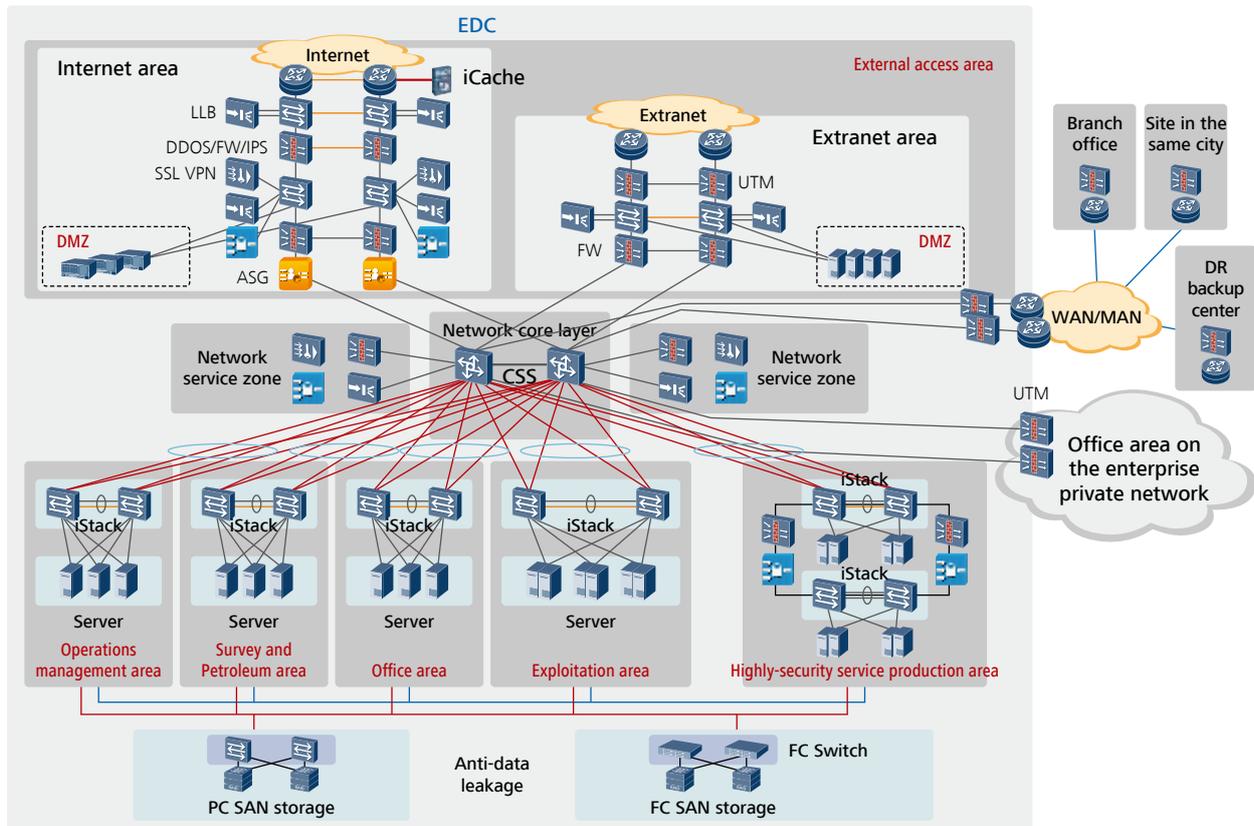


Huawei enterprise data center security solution comprehensively analyzes data center security from five security dimensions and three service layers and provides targeted security defense and security management solutions, resolving key security issues of enterprise data centers. Besides, Huawei provides consultation and relevant services for data center security to evaluate and enhance data center security.

Huawei enterprise data center security architecture consists of five dimensions, namely, identification &

authentication, access & authorization, audit trail, and response & recovery (IAARC for short). Identification & authentication identifies the user identity, access & authorization specifies the contents available to the user, content security detects the attack types, response & recovery ensures the timeliness of service response and recovery, and audit trail records behaviors for future audit. Huawei provides a targeted security solution based on the five security dimensions, effectively ensuring the secure operation of the enterprise data center.

21.1 Network Diagram



21.2 Highlights

Huawei enterprise data center security architecture provides hierarchical security defense based on the terminal, tunnel, and cloud.

- Terminal security provides security defense for the access from various terminals.
- Network security defends against internal and external attacks of the data center.
- Cloud security provides security defense for cloud hosts and services.
- Data security ensures the security of enterprise confidential data and sustainable service operation.
- Security management facilitates security regulation compliance and security event response.

21.3 Products

(The same as "Enterprise group Network Security Solution", refer to "19.3 Products")

22 Data Center Disaster Recovery and Backup Solution

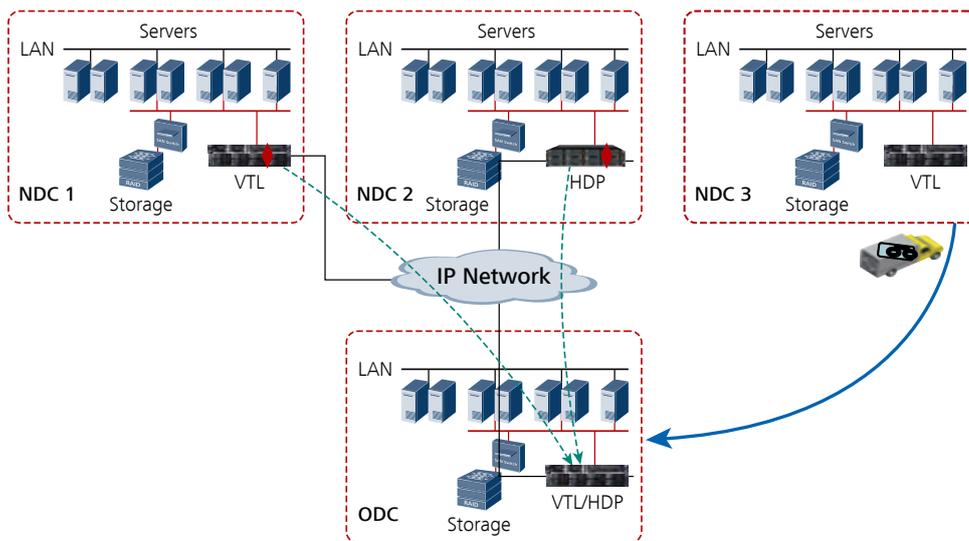


Data centers are a crucial component in the IT-based development and application process for oil and gas companies. The business systems of an oil and gas company includes the enterprise resource planning (ERP) system, logistics system, distribution system, retail system, portal, customer management system, prospecting system, and marketing system. All these systems are closely related to the data center which comes under threat or undergo system failures at times. Considering this danger, prevention mechanisms to lower the potential risks of service interruptions in oil and gas companies' business support systems and improve the continuous operations capability of the systems should be incorporated into system designs. For the disasters that oil and gas companies cannot avoid, they should prepare a system recovery mechanism to minimize business losses. At the same time, oil and gas companies also need to guarantee data security of crucial business systems and associated systems, thereby making the duration that a backup center needs to take over services acceptable and reuse of software and hardware equipment and data of the backup center possible.

Huawei provides the Data Center Disaster Recovery and Backup Solution to address these challenges. The solution supports media-level, data-level, and application-level DR.

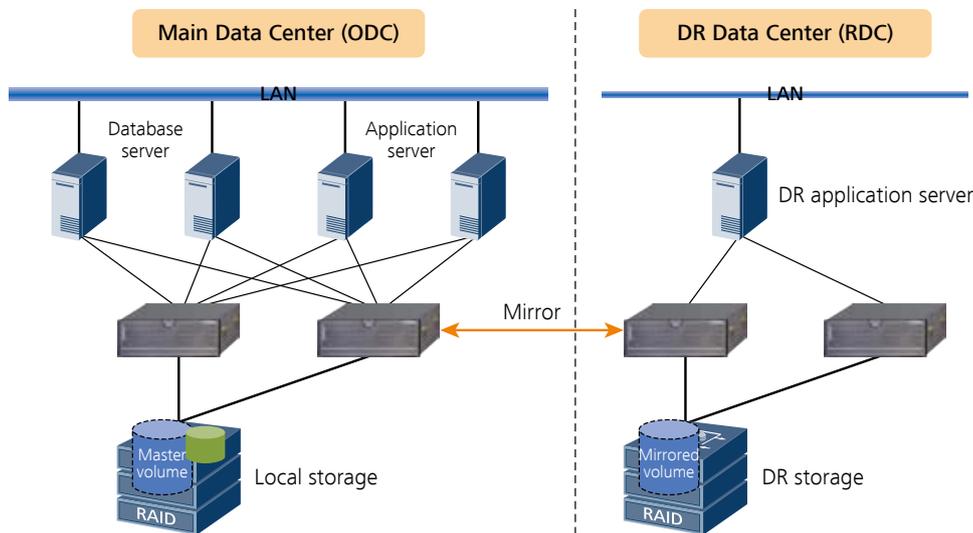
22.1 Network Diagram

Scenario 1: Media-level DR: between NDC and ODC



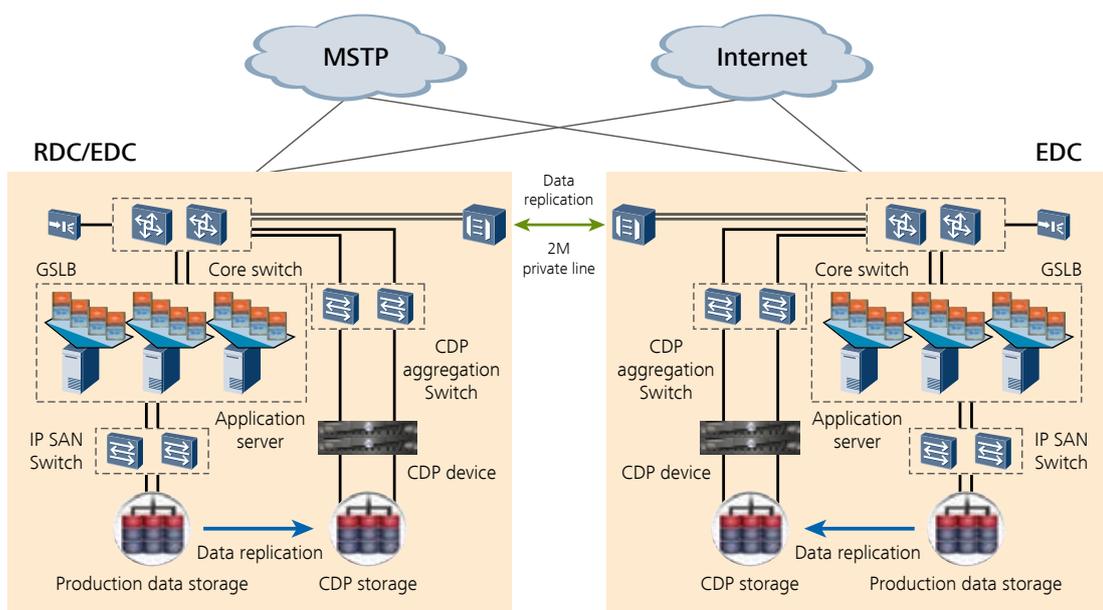
- Scenario requirements: Prepare a backup of multiple network data centers (NDCs) to the oilfield data center (ODC). The RTO and recovery point objective (RPO) are set to daily (day-level). The specific duration may vary depending on the network environment.
- Huawei Solution: Prepare a backup of NDCs to the ODC. The solution adopts the Huawei discover protocol (HDP), net backup (NBU) + virtual tape library (VTL) backup modes to achieve remote data backup for disaster recovery.

Scenario 2: Data-level DR: between ODC and RDC



- Scenario requirements: The customer has a well-established data center but lacks a DR mechanism. Driven by policies and the particulars of the company's operations, the company calls for DR services, but the requirements on real-time services is not high. The crucial data stored in an ODC should be backed up to the regional data center (RDC). The RPO is hourly (hour-level) while the RTO is between the hour-level and day-level.
- Huawei Solution: DR is provided from the ODC to RDC. With the deployment of the data-level DR solution, data stored in the ODC is copied to the backup data center. For homogeneous storage, the main components of the solution include storage area network (SAN) storage devices, storage switches, and remote data replication software. For heterogeneous storage, the main components of the solution include SAN storage devices, virtual intelligent storage (VIS) devices, storage switches, and remote data replication software.

Scenario 3: Application-level DR: from RDC to EDC and between EDC and EDC



- Scenario requirements: To secure the continuity of key businesses, the real-time requirements on DR are high. The RPO is minute-level, while the RTO is between the minute-level to hour-level.
- Huawei Solution: In the DR center, a database system is deployed in the physical server, while the application server and web server are virtualized to build a cloud and non-cloud hybrid environment, thereby reducing the investment on the DR center and saving energy. The DR center could also be deployed by adopting the container data center mode to make the center more flexible and mobile. Continuous data protection (CDP) software and hardware products are deployed at the production center and DR center to achieve application-level DR of the data center using CDP technologies. Of course, the solution can also provide application-level DR with the DR features of the application.

22.2 Highlights

- Multi-level DR solutions
 - media-level DR Solution
 - data-level DR Solution
 - application-level DR
- Cloud-based IT architecture
 - Dynamic IT infrastructure
 - Elastic platform resources
 - Improve resource utilization,
 - Reduce power consumption,
 - Reduce investment.
- Container DR center
 - Rapid and easy deployment
 - Security and Mobility
- Integrated services
 - Consultation services for DR.
 - Design services for DR.
 - Implementation services for DR.
 - Drilling services for DR.
- Green infrastructure
 - green equipment rooms,
 - provides container-type, modular, and building type construction modes.
- High Availability
 - Hardware HA
 - Network HA

22.3 Products

(The same as “Enterprise group Network Security Solution”, refer to “19.3 Products”)





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